094102

JPRS-ESA-85-005

4 February 1985

East Europe Report

SCIENCE AND TECHNOLOGY

19981022 078

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DTIC QUALITY INSPECTED 4

FBIS FOREIGN BROADCAST INFORMATION SERVICE

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

5
61
A04

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-ESA-85-005

4 February 1985

EAST EUROPE REPORT

SCIENCE AND TECHNOLOGY

CONTENTS

INTERNATIONAL AFFAIRS

Semiconductors at Leipzig Spring Fair
(A. Blodszun, W.E. Schlegel; RADIO FERNSEHEN ELEKTRONIK, Vol 33, No 6, Jun 84)..... 1

Data Acquisition, Measurement Devices at 1984 Leipzig Spring Fair
(K. Eckert, et. al.; RADIO FERNSEHEN ELEKTRONIK, Vol 33, No 6, Jun 84)..... 14

Computer Equipment at 1984 Leipzig Spring Fair
(V. Loeschner, B. Kasper; RADIO FERNSEHEN ELEKTRONIK, Vol 33, No 7, Jul 84)..... 32

CZECHOSLOVAKIA

Briefs
CSSR Manufactures First Magnetrons 40
New Lung Examination Method 40

GERMAN DEMOCRATIC REPUBLIC

New Optoelectronic Components for Machine Control Developed
(Rainer Schmid; BERLINER ZEITUNG, 24-25 Nov 84)..... 42

Briefs
New Power Metallurgy Facility 45
Center Produces Machine Controllers 45
Lab for Welding Automation 46

HUNGARY

Software Firm Thrives in Paris
(Katalin Gorgei; OTLET, 25 Oct 84)..... 47

New Regulations for Technical Development Financing Explained
(Edit Javorka Interview; HETIVILAGGAZDASAG, 17 Nov 84).... 50

Council of Ministers Affirms Priority of Computers, Microelectronics
(Kristof G. Kocsis; MAGYAR HIRLAP, 23 Nov 84)..... 55

Problems of Computer, Electronics Industry Noted
(NEPSZABADSAG, 24 Nov 84)..... 57

INTERNATIONAL AFFAIRS

SEMICONDUCTORS AT LEIPZIG SPRING FAIR

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 33 No 6, Jun 84 pp 344-348

[Article by A. Blodszun, W.E. Schlegel]

[Text] GDR

VEB Halbleiterwerk Frankfurt (Oder)

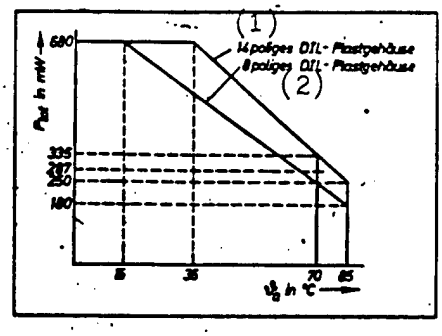
A new FM-ZF amplifier with demodulator bears the designation A 224 D and is a further development of the well known A 223 D. The IC has a constant and a controllable LF voltage output and a LF input connector for video recorders. Worthy of special mention is that the input and the demodulator are specially designed for operation with ceramic filters (5.5 MHz). An internal reference voltage source produces a stabilized voltage of 4.2 to 5.3 V and can be loaded to a maximum of 5 mA. The IC can be employed in the frequency range 0 to 12 MHz. Operating voltage U_{CC} = 10 to 18 V (typically 12 V). Signal-strength control range $\geq$ 70 dB, AM suppression $\geq$ 50 dB, total power dissipation 400 mW, operational temperature range θ_a = -25 to 70 deg C.

The operational amplifier family B 060 D through B 066 D is intended for universal application, especially in battery powered equipment. The series consists of the following types:

B 060 D one operational amplifier with external frequency compensation in an 8-pin DIP
B 061 D one operational amplifier with internal frequency compensation in an 8-pin DIP
B 062 D two operational amplifiers with internal frequency compensation in an 8-pin DIP
B 064 D four operational amplifiers with internal frequency compensation in a 14-pin DIP
B 066 D one operational amplifier with internal frequency compensation and external control of current admission I_{CC} in an 8-pin DIP

In addition, from the basic type with the D end designation, variants with respect to the permitted scatter range can be determined by relaxed or tight screening:

D for low requirements
D_m for higher requirements
D^m for highest requirements
D^p_t for expanded temperature range -25 to 85 deg C.



Power loss reduction curve of the BIFET operational amplifiers B 060 D through B 066 D, VEB Halbleiterwerk Frankfurt (Oder)

Key to Figure:

1. 14-pin plastic DIP
2. 8-pin plastic DIP

Common to all operational amplifiers is the SFET input stage which assures a high input resistance of 10^{12} Ω. The offset currents for all types are typically 5 pA; input bias currents are typically 30 pA. The current absorption per amplifier is typically 200 μA. The operational voltage range covers 0 to 18 V. If the temperature and U_{CC} are bounded such that the maximum permissible power loss is not exceeded, then the output can be continuously shorted with respect U_{CC} or ground. Additional technical data: differential input voltage U_{ID} = -30 to 30 V; common-mode input voltage U_{CM} = $-U_{CC}$ + 2V to U_{CC} - 2V; typical input offset voltages U_{IO} = 5 mV (D), 3mV (D_m, D_t), 2mV (D_p); output voltage $U_o \leq$ 26 V; common-mode suppression CMR = 92 dB (D), 95 dB (D_m, D_p, D_t); operational voltage suppression SVR = 95 dB; open circuit voltage amplification A_U = 6 x 10^3. These static values hold for U_{CC+} = $-U_{CC-}$ = 15 V; θ_a = 25 deg C. Listed for the transit frequency is 1 MHz and for the slew rate is 3.5 V/ s.

The operational power amplifier B 165 H/V is based on the LF amplifier A 2030. It permits a total power dissipation of 20 W and is frequency compensated internally. The IC contains circuits to protect against thermal overloading and for limiting output current. The operational voltage is U_{CC+} = $-U_{CC-}$ = 18 V; differential input voltage, 0 to 30 V; max output peak current, 3.5 A. Some typical values: current absorption I_{CC} = 40 mA; input offset voltage U_{IO} = 5 mV; input offset current I_{IO} = 20 nA; input bias current $-I_{IB}$ = 200 nA; open circuit voltage amplification A_U = 90 dB at $U_{CC+/-}$ = +/- 14 V and $R_L \rightarrow \infty$; ripple voltage suppression SVR = 50 dB; common-mode suppression CMR = 70 dB. This IC, like the A 2030, is housed in a TO-220 plastic power package.

The two-pin IC B 511 contains a temperature sensor which functions as a high resistance, constant current source. The constant current is set at 298 μA +/- 20 % and has a temperature coefficient of 0.8 to 1.2 μA/K. This circuit requires only a few external circuit elements and gets by without the previously common linearization circuits and without down-stream precision operational amplifiers. The typical operating voltage is U_{CC} = 4 to 30 V; the operating temperature range θ_a = -55 to 125 deg C. The circuit is housed in a three-pin SOT-54 package

with pin 1 providing input and output and pin 3 serving as the operating voltage U_{CC} terminal. Pin 3 is not used.

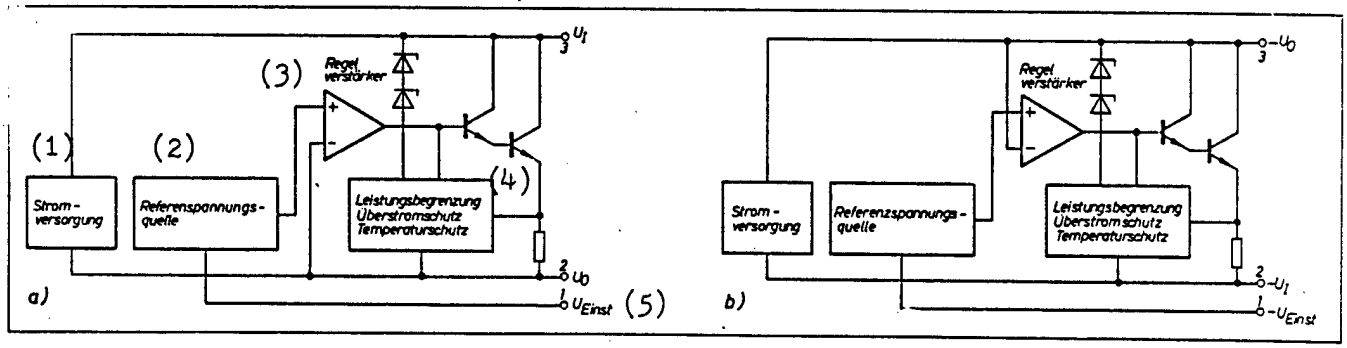
The temperature-compensated two-pin band gap reference voltage source B 589 generates a typical voltage of 1.235 V for input currents between 50 μA and 5 mA. At an operating current of 50 μA, the power dissipation is only 60 μA [60 μW]; therefore, this IC is especially well suited for battery operated equpipment. Depending on operating conditions, the temperature coefficient is

$$\frac{U_0}{U_0 \Delta \vartheta} \leq 10 \ldots 100 \cdot 10^{-6} K^{-1}$$

With the aid of this IC, such items as temperature-stable reference voltages and temperature monitoring circuits can be built up.

B 3170 V and B 3171 V are the designations for integrated, adjustable positive voltage controllers in TO-220 packages which are suitable for currents up to 1.5 A and output voltages from 1.2 to 37 and 1.2 to 57 V, respectively. With reverse polarity and data equivalent to them are the negative voltage controllers B 3770 V and B 3771 V. The two basic types differ in the value of voltage ripple suppression SVR which for the positive voltage controller is 60 dB and for the negative voltage controlller is 50 dB. The following values hold for all four types together; note the polarity of the voltages and currents.
Pin connections:
Pin 1 tuning connection
Pin 2 output U_O or input $-U_I$
Pin 3 input U_I or output $-U_O$

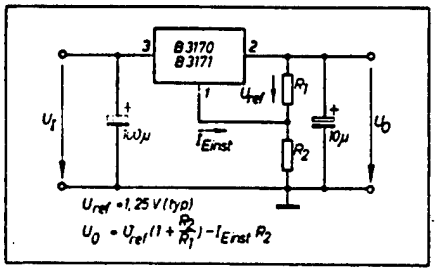
Some technical data: maximum I/O voltage difference U_D = 40 V (B 3170), -40 V (B 3370), 60 V (B 3171), -50 V (B 3371); maximum power dissipation 15 W; minumum output voltage 1.2 to 1.3 V; output current 10 mA to 1.5 A; maximum input voltage control 0.04 % (B 3170, B 3370), 0.06 % (B 3171), 0.067 % (B 3371); maximum load control 30 mV; output short-circuit current 1.6 to 3 A; current at the adjustment terminal I_{ADJ} = -100 μA (positive controller), 100 μA (negative controller).



Primary circuits of the adjustable voltage regulators: a) B 3170 D, B 3171 D; b) B 3370 D, B 3371 D, VEB Halbleiterwerk Frankfurt (Oder)

Key to Figure:

1. Power supply
2. Reference voltage source
3. Control amplifier
4. Power limiting over-current and over-temperature protection circuits
5. U_{ADJ}



User circuit of the IC B 3170 D or B 3171 D

For building 4 1/2- and 3 1/2-digit digital voltmeters, analog processors C 500 D and C 501 D are provided. To this system belong the digital processors C 502 D with 7-segment multiplex output (4 1/2 digit) and C 504 D for 14-bit-wide BCD output information with ancillary functions. The analog processors are realized in BiMOS technology and the digital processors in I^2L technology. Some data associated with the analog processors: operating voltage $U_{CC+} = -U_{CC-} = 0$ to 18 V; $U_I = U_{CC-}$ to U_{CC+}; comparator output voltage 0 to U_{CC+}; current absorption $I_{CC+} \leq 20$ mA; $I_{CC-} \geq 18$ mA; input current $I_{IH} \leq 40\ \mu A$, $I_{IL} \geq -300\ \mu A$; linearity error $\leq +/-5 \times 10^{-5}$ (C 500 D), $\leq +/-5 \times 10^{-4}$ (C 501 D). Typical values for the operating voltages are $U_{CC+} = U_{CC-} = 12$ V, for reference input voltages $U_{Iref} = 1$ V and for analog differential input voltage +/- $U_{ID} = 2$ V. Some data for the digital processor C 502 D: $U_{CC} = 0$ to 7 V; $U_I = 0$ to 5.5 V; $I_{CC} \leq 110$ mA; output voltages $U_{OL} \leq 0.5$ V, $U_{OH} \geq 4$ V. Unfortunately, the data sheet for this type circuit contained ambiguities; therefore, in the interest of clarity, we must forego the presentation of additional data.

Driver chip D 714 X is provided for driving heater resistances in thermal-printing heads. Besides the current driver function for 16 heater resistances, this IC aslo accomplishes series-parallel conversion and intermediate storage of 16-bit information. The open-collector outputs can be activated either simultaneously or in groups of four. To provide a greater line length, several chips can be cascaded. Some typical data: $U_{CC} = 4.5$ to 5.25 V; $U_{IH} \geq 2$ V; $U_{IL} \leq 0.8$ V; clock frequency 500 kHz; data retention time 600 ns; total current absorption with output stages on $I_{COL} \leq 125$ mA, with latched output stages $I_{COH} \leq 38$ mA; chip dimensions, 2.8 mm x 3.3 mm.

Blink generator IC E 310 D is used in automotive electronics. It is suitable for vehicles with 12 and 24 V systems. An internal oscillator drives the blinker relay. In addition to controlling the blink function, it is also possible to provide a fault indicator, for instance for failed blinker lamps. The blink frequency itself is varialbe over a 30 % band by simply joining two terminals. $U_{CC} = 0$ to 30 V; $P_{tot} \leq 1$ W; $\theta_a = -25$ to 85 deg C.

VEB Mikroelektronik "Karl Liebknecht" Stanhsdorf

The Si-npn Darlington transistor SU 111 is provided for electronic ignition systems. Its collector-emitter voltage U_{CEO} amounts to 400 V. From it derivative types are manufactured: SU 110 with U_{CEO} = 350 V and SU 112 with U_{CEO} = 450 V. Some technical data: I_C = 10 A; P_{tot} = 120 W; $U_{CEsat} \leq 1.8$ V; $U_{BEsat} \leq 2.5$ V; $U_{(BR)CEO} \geq 400$ V; forward bias of the free running diode $U_F \leq 3$ V at $I_F \leq 7$ V.

The Si-npn power transistors SU 189 and SU 190 are used in switched-mode power supplies and motor controllers. They differ in the collector-base voltage U_{CBO} = 850 V (SU 189) and 1,000 V (SU 190) and in the collector-emitter voltage U_{CEO} = 400 V and 450 V, respectively. I_C = 15 A; P_{tot} = 175 W; $U_{CEsat} \leq 1.5$ V; $U_{BEsat} \leq 1.6$ V; $U_{(BR)CEO} \geq 400$ V (SU 189) and ≥ 450 V (SU 190).

VEB Mikroelektronik "Karl Marx" Erfurt

The CMOS component series V 4000 was expanded by the following 7 types:

V 4007 D	2 complementary transistors, 1 inverter
V 4017 D	decimal counter and divider
V 4019 D	4 AND/OR selectable gates with 2 inputs each
V 4029 D	4-bit forward and backward counter
V 4034 D	8-stage bidirectional shift register (bus register)
V 4044 D	4 RS flip flops
V 4048 D	multifunction gate with 8 inputs; the desired logic connections can be selected via 3 control inputs.

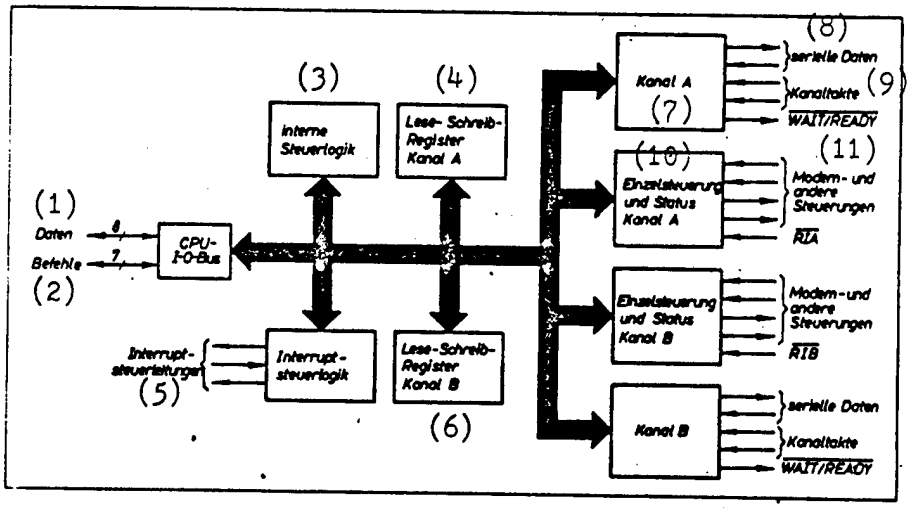
Presented for the first time were the 16-bit microprocessors U 8001 and U 8002 D. The widely proliferated U 880 microprocessor system has been expanded. Worthy of first mention is the creation of the 4-MHz variant UA 880 in which are offered all components of the system, including those newly conceived. The 2.5 MHz version with an expanded temperature range covering θ_a = -25 to 85 deg C bears the designation VB 880 and contains the following systems: CPU, PIO, SIO, DART and CTC.

New is the direct memory access (DMA) unit UB 858 D which provides for direct data transfer between various memory areas or between peripherals and memory. The DMA is housed in a 40-pin DIP.

Likewise belonging to the U-880 system is the asynchronous serial I/O circuit UB 8563 D (DART). This IC is fully TTL compatible and permits a maximum data transfer rate of 550 kbit/s. The received data and error register are fourfold buffered and the data to be transmitted is twofold buffered.

Important innovations are three 8-bit single-chip microcomputer families. The Types UB 8810 D and UB 8811 D are housed in 40-pin plastic DIPs and contain among other things an internal ROM which is programmed at the factory. Programmable by the user are types UB 8820 M and UB 8821 M which are manufactured without the ROM area. The case is a 64-pin plastic QIP. Designed as BASIC interpreters with bootstrap loaders are the types UB 8830 D and UB 8831 D. In all cases, the maximum clock frequency is 8 MHz; under the designation UD 88.., a 3.6 MHz variant is offered for all types. The type designations ...0 and ...1 indicate bond variants: the 0 variant contains an internal oscillator so that direct connection of a clock is possible; variant 1 permits power-down operation.

The UL-7211-D and the UP-7211-D ICs are used for driving 4-place 7-segment LCD displays; they are packaged in plastic 40-pin DIPs. They process the BCD input information but differ with respect to data input. In the case of the UL 7211 D, the 4-bit data information and the 2-bit digit information are intermediately stored as a function of 2 OR connected chip-select inputs; with the UP-7211-D IC, the digit associated with data information is sent to a corresponding digit-select output. Both ICs are based on a common concept; they are realized in CMOS technology. Operating voltage U_{DD} = 6 V, current absorption $I_{DD} \leq 40 \mu A$, input residual current $I_L \leq 1.4 \mu A$, input capacitance $C_I \leq 20$ pF.



Primary circuit of the DART IC U 8563 D,
VEB Mikroelektronik "Karl Marx" Erfurt

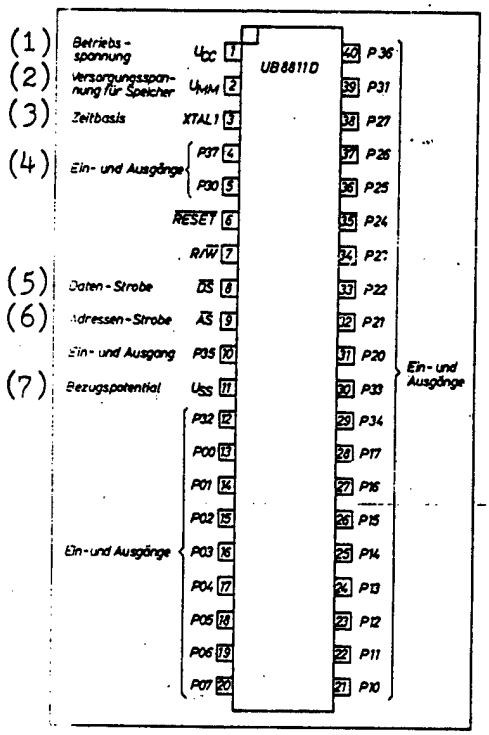
Key to figure:

1. data
2. command
3. internal control logic
4. read/write register channel A
5. interrupt control lines
6. read/write register channel B
7. channel A
8. serial data
9. channel clock
10. individual control and status channel A
11. modem and other controls

VEB Werk Fuer Fernsehelektronik Berlin

The GaAs IR emitter diodes VQ 125 and VQ 126 are housed in a smoke-colored plastic lense mask of 5 mm diameter. They differ in their radiation angles of 50 deg for the VQ 125 and 20 deg for the VQ 126 and are provided particularly for applications in infrared remote control units but are also suitable for use in other applications in the near infrared domain in entertainment electronics, in games and in industrial electronics. Wavelength 940 nm, forward current I_F = 100 mA, forward DC voltage U_F = 1.4 V, radiation power 14 mW.

VQ 130 is the designation of a GaAs high-power emitter diode with a Si photodiode as monitor and an optical cable with connector; its is used in long-line optical transmission. Its wavelength band is between 820 nm and 870 nm; its maximum peak radiation power is 130 μW; continuous radiation power is 100 μW. Tailored to it is the Si avalanche diode SP 104 with optical cable and connector. Its spectral sensitivity at λ = 850 nm and U_R = 10 V is 0.4 AW^{-1}.



Pin connections for the single-chip microcomputer UB 8811 D
VEB Mikroelektronik "Karl Marx" Erfurt

Key to figure:

1. operating voltage
2. memory power supply
3. time base
4. input/output
5. data strobe
6. address strobe
7. reference potential

Also provided for use in optical transmission systems is the GaAlAs IR diode VQ 170 with jack package; a releasable pin connection provides for connection to the optical conductor. Forward DC voltage U_F = 1.7 V, radiation power 540 μW, wave lengths 790 to 850 nm. Here, the Si pin photodiode SP 107 is provided as a receiver diode in the same package with a flange width of 8.4 mm. Its integral sensitivity amounts to 2.0 μA/klx; spectral sensitivity at λ = 820 nm is 0.45 AW^{-1}.

The Si-npn-planar phototransistor SP 215 is contained in a 5-mm all-plastic lense package and has an open base; it is controlled by incident light. It is tailored for use with GaAs IR emitter diodes and is intended to be used primarily in IR light barriers as a receiver in such areas as consumer electronics, games and industrial electronics. Collector current I_C = 8 mA at 1 klx and U_{CE} = 5 V; wave length at maximum spectral sensitivity is λ = 850 nm; spectral sensitivity range $\Delta\lambda$ = 450 to 1,050 nm; aperture angle 50 deg; U_{CEO} = 50 V; U_{ECO} = 7 V.

The two-color LEDs VQA 60, VQA 70 and VQA 80 are provided for display use; they come in diffuse, noncolored all-plastic lense packages with the following color combinations:
VQA 60 red and green
VQA 70 red and yellow
VQA 80 yellow and green.

The two colors are achieved by two chips per LED which have a common cathode; the anodes are driven individually. Through simultaneous excitation, mixed colors can be produced. Forward DC voltage U_F = 2.6 V at I_F = 10 mA; wave lengths of maximum spectral emission: red 625 to 645 nm, green 555 to 570 nm, yellow 580 to 600 nm.

The LED displays VQB 26, VQB 27 and VQB 28 are green-emitting light-barrier components with GaP diode chips. The VQB 26 has individually accessible cathodes and anodes and present the characters +, -, 1 and decimal point. The VQB 27 and the VQB 28 are single-place, 7-segment displays. The VQB 27 has a common cathode and the VQB 28 has a common anode. Character height is 19.6 mm.

VEB Zentrum fuer Forschung and Technologie Mikroelektronik Dresden

Presented at Leipzig was the CMOS version U 224 D of a further development of the 4-kbit static RAM U 214 D. The types U 215 D and U 225 D are also static 1-kbit RAMS with freely selectable access and 1024 x 1 bit arrangement. They are realized in n-channel silicon-gate ED technology and differ in their output stages. The memory U 215 D has open-drain outputs; the U 225 D has tristate output levels. There are derivatives of both types: U 215 D1 and D 225 D1 with 140 ns access times compared to 95 ns for the basic types. The memories are fully TTL compatible.

U 832 is the designation of a 16-bit arithmetic IC for microcomputer systems; it will be discussed in the next edition of our magazine.

Several other interesting ICs were presented by the VEB ZFTM which can only be named here since no technical information was available at the fair:
U 8047 D 4-bit, single-chip microcomputer in CMOS technology
U 1001 D integrated filter circuit
U 1011 D codec IC
U 1021 D time status IC
U 2164 D dynamic 64-kbit RAM (64K x 1 bit)

Soviet Union

The foreign trade company Elektronorgtechnika was again present with a representative selection of modern integrated circuits which generally covered the main features of circuits presented at the previous fair.

The company entered the Leipzig Fair Gold Medal Competition with the static 1-kbit RAMs KP 132 py 4 A and KP 132 py 4 B which are fully TTL compatible and correspond in pin assignment with the DDR type U 215 D. Current absorption is I_{CC} = 38 mA; delay time for the KP 132 py 4 A is t_{CO} = 25 ns and for the B variant is 47 ns; write cycle time is 47 ns for type A and 90 ns for type B; read out time is 47 ns for A and 90 ns for B.

CSSR

The booth of the Czechoslovakian semiconductor manufacturers Tesla Rožnov k.p. and Tesla Piešťany k.p. displayed products which we were already familiar with from our visit to the Machine Fair in Brno in 1983 (see RFE Nr 12/83). New to us was the monolithic, integrated Hall generator MAF 100 which serves as a sensor and control component for steady and alternating magnetic fields. It has a sensitivity of at least 1.4 mV/10^{-2}T, an output residual voltage of 10 mV max and its current absorption is $I_{CC} \geq 3$ mA at $U_{CC} \geq 5.5$ V.

Polish People's Republic

Unitra Cemi showed the CMOS component series MCY 74000 which corresponds to the international B series and which per catalog contains about 50 types. MC 14009 is the designation for a computer circuit intended for use in scientific pocket calculators. It contains 18 mathematical functions, can be linked to a MC 14010 memory, has ten addressable memories and five levels of parentheses. Output is via a LED display.

The watch circuits MC 1202 and MC 1203 are provided for LCD displays. The MC 1202 IC works with the functions hours, minutes, months, days, day of week, and seconds in the 24- or 12-hour mode. The second named type has in addition a wake-up function. Both work with a 32768-kHz quartz generator.

Hungarian People's Republic

The Hungarian manufacturer Mikroelektronikai Vállalat also had essentially the same product display as last year. New were customized gate arrays. The MOS-LSI array U 400 can hold up to 400 NOR gates with 4 inputs on a single chip. Other basic cells can be taken from a system library and assembled into customized circuits. The GA-800 LSI gate array system contains 6,000 transistors per chip with the following functions: 70 master/slave D flip flops; 420 NOR gates with 2 inputs each; 70 NAND gates with 2 inputs each; 70 inverting bus drivers and 26 input and output levels. The customized wiring pattern can be designed manually or computer aided.

Passsive components

Without the previously described integrated circuits and optoelectronic components, there would be no microelectronics. But passive electronic components such as resistors, capacitors and inductors are required as always. Of course, their technical advancement has proceeded at a slower pace. What was seen in the way of new and further developments at Leipzig is briefly described below.

Kombinat VEB Elektronische Bauelemente Teltow

Two characteristics of note apply to all components of this combine: the smallest possible dimensions and high reliability.

The VEB Elektronik Gera exhibited several newly developed capacitor types. The motor capacitors in MKP technology are rated at 240, 340 and 440 V and have capacitances of 1 to 20 μF. They have a low power loss (25 % of previous values), are self repairing, resistant to over voltage and bear the VDE qualification seal. Application: consumer goods, machine tools, office machines and construction machinery.

The ceramic wafer capacitors with very small capacitances rated at 100 V and having 0.22 to 2.2 pF meet international requirements. The capacitance tolerances are listed as +/- 0.1 pF. Applications: high signal strength VHF-UHF tuners with field effect transistors.

Suitable for tuning oscillator circuits and for electronic watches is the ceramic wafer trimmer of 3 mm diameter. Ratings are 25 V and 5 to 30 pF.

The aluminum electrolytic capacitors of cylindrical form have a pad for automatic insertion into circuit boards. Ratings are 6.3, 10, 16, 25, 40, 63, and 80 V and 0.47 to 4,700 μF. Applications: filtering, coupling, decoupling, and RC circuits in consumer goods and in commercial electronics.

Special characteristics of the aluminum electrolytic capacitors for switched circuits are high overload resistance to superimposed alternating current and low equivalent series resistance. Ratings are 6.3, 10, 16, 25, 40, 63, and 80 V and 1,000 to 100,000 μF.

For elevated requirements in consumer goods and in professional electronics, the VEB Kondensatoren werk Freiberg manufactures tantalum-bead capacitors. Ratings are 3, 6.3, 10, 16, 20, 25, 35, and 50 V and capacitances of 0.1 to 330 μF.

The VEB Elektrophysicalische Werkstaetten Neuruppin developed for user requirements a flat foil keyboard intended for use in consumer goods and industrial electronics:

Switching voltage	0.1 to 30 V
Current	0.1 to 100 mA
Life	10^7 switch manipulations

Surface form, design and color according to customer specifications.

The multilayer circuit boards displayed by the VEB Kontaktbauelemente und Spezialmaschinenbau Gornsdorf are manufactured by a new process. Listed as special characteristics were
- extreme packing density
- ten circuit board levels, max.
- size, hole diameters, conductor path widths per customer specifications
- quick turnaround delivery.

applications: computertechnology, aircraft electronics and space technology.

From the VEB Elektronische Bauelemente "Carl von Ossietzky" Teltow came the film resistor K 0207 in metal film technology.

Rated power	0.25 W
resistance values	1Ω to 1.5 MΩ
Temperature coefficient	+/-250 x 10^{-6}/K

Belted for automatic insertion into circuit board. Applications: radio and television and industrial electronics.

The new series-250 potentiometers from the VEB Elektronische Bauelemente Dorfhain are 12.5-mm rotary film resistors for standard wiring and printed circuits and are intended for use in entertainment electronics.

rated power	0.03 to 0.05 W
resistance values	100 to 1 M

Simple and tandem arrangement; attachment and shaft ends per user requirements.

From the same factory come the series-562 medium-load potentiometers. This newly developed wire-wound resistor meets the highest international standard values, according to the manufacturer.

rated power	4.5 W
rated resistance	4.7Ω to 2.2 x 10^{4}Ω

Special characteristics:
- oxidized Al strips as base material
- thermoplastic package
- simple and dual potentiometer designs

VEB Kombinat Elektromaschinenbau

The VEB Elektromotorenwerk Hartha exhibited several small motors for which we present technical data in the following paragraphs.

The 1170.1 and 1170.1/1 DC motors with electronic commutation are permanently excited low-power DC motors which were developed to drive high quality cassette tape players. The main features of these drives are their electronic commutation and rpm control as well as the design intergration of the electrical machine and the associated complete control and regulation electronics.

Technical Data

	Type 1170.1	Type 1170.1/1
Rated DC voltage	9V	12 V
DC voltage range	6.3 to 10 V	8 to 13.2 V
Rated current (typical values)	65 mA	55 mA
Rated moment	6 x 10^{-4} Nm	
Rated speed	1,500/min	
Speed range adjustment	+/- 2.5 %	
Stability of rated speed	≤+/-2 %	
Duty cycle	continuous	
Rated radial loading of motor shaft	≤+/-1.2 N	

Form of construction	IM 9181 TGL RGW 246
Protection level	IP 30 TGL RGW 247
Use class	+5/+45/+25/70/1002 TGL 9200/03
Sense of rotation	right/left

Series GMM DC micromotors with hollow rotors are produced with a rated moment of 0.035 to 2.0 Ncm. They are precision motors for a wide range of drive uses in instrumentation, controls, electronic computers, writing and copying units and in medical, photographic and precision equipment.

Use determining characteristics are
- low rotor mass and moment of inertia
- small electromechanical and electrical time constants
- no core loss
- high efficiency even at partial load
- low starting voltage
- no break-away torque
- small deviations from synchronism even at low rpms
- linearity of operating characteristics

Motor design features include:
- hollow, air core rotor
- high-grade AlNiCo core magnet
- precious metal commutator and brushes or copper commutator and carbon brushes
- nonlubricated sintered metal bearings.

The permanently-excited, precision, ultrasmall motor with keyed rotor of type 1223.3 per TGL 35866 is distingished by its high power to volume ratio and its light weight. Areas of use include: electronic data processing, optics, precision equipment and guidance and control engineering.

Technical Data:

Rated DC voltage	24 V
Rated current	0.98 A
Rated speed	5,000 rpm
Rated moment	3 Ncm
Duty cycle	continuous
Style	IM 4041 TGL RGW 246
Protection level	IP 20 TGL RGW 247
Sense of rotation	right/left
Use temperature range	-10 to 40 deg C
Heat endurance class	B, TGL RGW 782
Starting torque	$\leq$ 11 Ncm
Rotor moment of inerta	35 gcm^2
Electromechanical time constant	$\leq$ 20 ms
Climatic protection	T III TGL 9200
Radio frequency interference	not susceptible
Weight	0.28 kg

It is obvious that by now there is a well developed component industry in the People's Republic of China as indicated by the presence of modern electronic equipment in building 17. As is well known, Japan has delivered to China a large number of industrial facilities especially for the production of color television sets; however, we were assured at the booth that most of the displayed products were the products of their own development and manufacturing. From a catalog we could see that standard TTL, Schottky TTL, low power Schottky TTL, ECL, CMOS, pMOS, nMOS, and linear ICs such as operational amplifiers and voltage regulators plus IC families for radio and TV equipment are serially produced.

9160
CSO: 2302/3

DATA ACQUISITION, MEASUREMENT DEVICES AT 1984 LEIPZIG SPRING FAIR

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 33 No 6, Jun 84 pp 355-363

[Article by K. Eckert, G. Raab, B. Kasper]

[Text] GDR

For the application of microcomputer technology to electronic instrumentation, the VEB Meszelektronik Berlin developed a compact modular test system which consists of the PSA-1301 programmable control and display system and a PZG-2000 peripheral add-on unit. This equipment system is the basis of the two instrumentation computer variants PSA and MCS which bring a high degree of rationalization to laboratory and field test automation and to the automation of instrumentation and test procedures. The MCS is also used for commercial applications.

The PSA instrumentation computer system is specially designed for the requirements of electronic instrumentation. It is a microcomputer-controlled alphanumeric graphic display unit which, via its display function, can be used as a universal control unit for various automated instrumentation complexes. Also, it can be used as an independent measurement system for frequency, time and DC voltage and as a low frequency storage oscilloscope. The following are the main characteristics of the PSA instrumentation computer system:
-- use of an EPROM operating system (SYS-PSA)
-- standard measurement sequences preprogrammed in BASIC and Assembler and stored on EPROMs
-- primary application for control of the PDM-60 level and warble measurement station and other analog measurement stations
-- advantageous application for manual measurements or for automatic, preprogrammed individual measurements
-- field test applications
-- data input, instrumentation unit and operating function selection and automated test function control is accomplished via the front panel keyboard.

The MCS instrumenation computer is a system built on the PSA system intended for laboratory automation with potentials for commercial applications. It chief features compared to the PSA instrumentaion computer system are the greatly expanded memory area and the use of a complex cassette tape operating system with a large range of user-oriented problem solutions.

Photo caption: PSA-1301 programmable control and display unit, VEB Meszelektronik Berlin

The VEB Robotron Meszelektronik "Otto Schoen" Dresden exhibited the fault locating vehicle M 4601 which is a mobile measurement station for locating faults in low, medium and high voltage power cables and other types of cables and lines. It contains all necessary equipment and apparatus for locating faults with modern measurement methods in the least amount of time. Worthy of note is the low power consumption of the facility.

The VE Kombinat Praecitronic Dresden developed a series of measuring units for optical transmission engineering which are intended for use on short lines or in communications engineering. All units are designed for a mean wavelength of 820 nm (short lines) or 850 nm (communications engineering).

The OTS-11 optical test transmitter and the OTE-11 optical test receiver are used for functional checking of optical cables. For this purpose, the test transmitter injects unmodulated light into the cable, and the transmitted light level is displayed as an analog signal at the receiver. The transmission power of the OTS 11 is -30 dBm. Over the range -70 to +10 dBm, the OTE 11 has a magnitude error of +/-3dBm. The power supply for both units is an internal battery with dimensions of 100 x 65 x 100 mm.

The OPM 11 is a compact unit with optical transmitter and receiver sections which can be used as a level and damping measurement station on optical transmission equipment and also as an independent transmitter of receiver.

Photo caption: OPM-11 optical magnitude and damping measurement station, VEB Kombinat Praecitronic Dresden

Technical Data

Transmission level	-30 to -14 dBm, -20 dB (unmodulated light), modulated light (right angle)
Receiving level	-90 to +10 dBm
Damping measurement range	0 to 70 dBm
Display	
digital	3 place
analog	analog instrument
Power supply	network, internal batteries or external DC
Dimensions in mm	250 x 82 x 300

For high-fidelity impulse conversion of electrical signals into optical signals and the latter's coupling into optical cables was the EO-11 electrical-optical converter developed. Conversely, the OE-11 optical-electrical converter provides for the high-fidelity impulse conversion of optical output signals into electrical signals.

Technical Data

EO-11 Electrical-Optical Converter

Transmission level	-20 dBm
Frequency domain modulation	up to 50 MHz
Impulse rise time	10 ns
Dimensions in mm	230 x 135 x 85

Technical Data

OE-11 Optical-Electrical Converter

Level range	0 to -60 dBm
Upper frequency limit	50 MHz
Impulse rise time	10 ns
Dimensionns in mm	260 x 180 x 85

The OF-11 optical-fiber fault locating unit is used in combination with electrical fault locating units for locating defects in optical-fiber cables. In this process, point-to-point and back-scattering measurements are made.

Photo caption: OF-11 optical-fiber defect locating unit, VE Kombinat Praecitronic Dresden

Technical Data

Transmission level	+10 dBm
Dynamic range	60 dBm
Bridgeable cable damping	
point-to-point measurement	23 dB
back-scattering measurement	10 dB
Dead zone at cable start	15 m
Power supply	220 V or external batteries (11 to 18 V)
Dimensions in mm	242 x 82 x 300

At the Technical University of Dresden was developed the microcomputer-controlled LA-32/20-K logic analyzer which can be applied universally for solving hard- and software problems. Its technical parameters are representative of the international state of the art. It provides for both time and condition analyses in digital systems. The recording of complex processes is made possible by its 32 channels and great memory depth. The many sampling possibilities of the information flow being studied permits adaptation to many measurement situations. A well designed trigger processor supports the analysis of synchronous and asynchronous processes. It enables triggering on simple and complex events and trigger word sequences with event counting and, within broad limits, selectable trigger delay. Adaptation to the measured object is accomplished via programmable sampling heads.

The software-controlled interactive system of the LA-32/20-K was structured to be user friendly and uses for communications an alphanumeric keyboard and a color graphics terminal. The logic analyzer is a compact unit with an integrated black-and-white display housed in the cabinet of the MC 80 from the VEB Elektronik Gera. The integrated cassette tape unit stores the LA-8583 program system.

Photo caption: LA-32/20-K microcomputer-controlled logic analyzer, T. U. Dresden

Technical Data

Number of channels	16	32
Maximum sampling frequency	20 MHz	10 MHz
Memory depth (events data)	1 x 4k or 4 x 1k	1 x 2k or 4 x 512
Internal sampling clock rates (Logic-time analysis)	50, 100 and 500 Hz; 1, 5, 10, 25, 50, 100, 250 and 500 kHz; 1, 2.5, 5, 10 and 20 MHz	
External sampling clock inputs (Logic condition analysis)	external clock input or one of the channels 1, 5, 9 or 13	
Trigger types	internal, external synchronous, asynchronous single and multilevel triggering	
Multilevel triggering	15 triggering levels with triggering on compact trigger words	
Trigger delay	1 through 65,535 sampling clock cycles	
Trigger event counters	1 through 255 trigger events	
Noise smoothing for triggering	25, 50, 75, 100, 150, 200, 300, 400 ns	
Glitch detection	20 ns pulse	
Sensing-head trigger threshold	-12.7 V to +12.7 V in 0.1-V steps	
Input resistance	> 1 MΩ	
Input capacitance, max. allowable	< 5 pF	
Input voltage	+280 V/-150 V	

Soviet Union

The Soviet foreign trade company Mashpriborintorg was represented with several electronic instrumentation devices. Probably the largest product group at the exhibition was a collection of oscilloscopes which were to be seen at the Leipzig Fair for the first time and which clearly constituted a broad spectrum of the equipment currently being manufactured in the USSR. Exhibited, among others, were the C-1-94 service oscilloscope; the C-1-82, C-1-83, C-1-91/1, C-1-93, C-1-99, C-1-101, C-1-104 and C-1-107 universal oscilloscopes; the C-1-118 precision oscilloscope and the C-8-12-A, C-8-13 and C-8-14 memory oscilloscopes. The most important technical data for these units are presented in our report on the 8th Exhibition of Electronic and Electrical Instrumentation, Guidance and Control Equipment in volume 4 (1983).

Photo captions:

C-1-91 universal oscilloscope, Soviet Union
C-1-107 universal oscilloscope, Soviet Union
X-1-50 instrumentation unit for determining amplitude and frequency characteristics, Soviet Union.

From the family of instrumentation equipment for determination of amplitude and frequency characteristics, the products summarized in the table were to be seen. They are used for the rational adjustment of resonant circuits, frequency filters, antenna tuning and many other instrumentation tasks in the laboratory, in field tests and in service shops. They can be used effectively for many purposes since

the results of manipulations on the test object can be read out immediately and directly on the CRT. With the aid of the P-2-73 to P-2-77 standing-wave voltage ratio instruments, the standing-wave voltage ratio of coaxial conductors and other elements can be presented on the panoramic display unit. Amplitudes can be presented with linear or logarithmic scales. The type designations and scale ratios are as follows:

P 2-73 3.5/1.52 mm; 7/3.04 mm; 16/4.6 mm; 16/6.95 mm
P 2-74 3.5/1.52 mm
P 2-75 7/3.04 mm
P 2-76 16/4.6 mm
P 2-77 16/6.95 mm

Types P 2-74 to p 2-77 are production variants of the basic P-2-73 unit.

The units are equipped with a microprocessor and can be programmed via an input unit. Interactive operation is also possible. The measurement results are presented in alphanumeric and graphic form on the screen of the playback unit. Coupling with other computers is possible. This mensuration unit has many uses, such as the measurement of standing-wave voltage ratios, damping, amplification and sounding power.

Technical Data

Working frequency range	10 to 1,250 MHz
Measurement range of standing-wave voltage ratio	1.03 to 5.0
Measurement range of transmission factor	-50 to +30dB
Measurement uncertainty for standing-wave voltage ratio (K = measured value of standing-wave voltage ratio)	+/-(3k+1) %
Measurement uncertainty of transmission factor (Ax = measured value of transmission factor)	+/-(0.03Ax + 0.2) dB
Power consumption	470 VA
Outside dimensions in mm	
frequency warbler	488 x 475 x 93
panoramic display unit	488 x 536 x 253
Weight	
frequency warbler	15 kg
panoramic display unit	25 kg

The ИПВСА-1Р instrumentation unit is suitable for automatic measurement of the instability and the characteristic values of signals of stable and highly stable standard frequency generators and of signal sources with limited stability. The functional operation is based on the principle of dual channel phase demodulation of signals at phase quadrature with synchronization of the two independent, highly stable sources, which are contained in the unit, and ultimate correlation processing of the signals. The unit consists of two standard cabinet inserts and an external microcomputer. It can be used for controlling the noise parameters of generators, amplifiers, converters and mixing units.

Photo caption: ИПВСА-1Р automatic unit for measuring of instability and characteristic values of standard frequency generators, Soviet Union

Technical Data

Frequency range	1 to 100 MHz
Limit resolution capability	2×10^{-14}
Frequecny discrimination error	10^{-10}
Dimensions in mm	240 x 520 x 510
Weight	15 kg

The digital frequency meter Ч43 3-07-0001 is used for measuring 1) the frequency and period of impulsive and sinusoidal signals; 2) the impulse duration and time interval, the ratio, product, sum and difference of frequencies and periods of sinusoidal and impulsive signals and 3) the train frequency of impulsive radio signals and for readout of standard frequency voltages. It can be employed in automated measurement systems and can be remotely controlled by a computer. The unit can also work as an impulse counter.

Technical Data

Frequency range	0.01 Hz to 500 MHz
Input voltage range	0.1 to 150 V
Minimum impulse duration measurement	5 ns
Measuring time	0.1 μs to 100 s
Instability of the built-in quartz generator in 12 months (the unit can be driven by a standard external frequency source)	1×10^{-6}
Standard frequencies	0.1, 1, 10, 100 Hz; 1, 10, 100 kHz; 1, 5 MHz
Power consumption	250 VA, max.
Dimensions in mm	490 x 215 x 480
Weight	25 kg

The calabration unit B 1-15 is used for determining the measurement errors of HF voltmeters and can also be used as a voltage calibration source for calibrating a variety of other instrumentation units. The output voltage can be varied by +/-30 percent in relation to its rated voltage. The capability is provided for operating the unit with an external HF generator. Remote operation of the unit and a peripheral output unit is provided. The calibration facility consists of the measurement and generator blocks plus the HF voltage divider.

Technical Data

Output voltage range (effective value)	3 mV to 3V
Output voltage tolerance as a function of frequency	+/-0.5 to +/-6 %
Fixed frequency range for output voltage	30 to 1,000 MHz (+/-3 %)
Output voltage distortion factor	0.15 to 1.5 %
Power consumption	110 VA

Photo caption: B-1-15 calibration unit for volt meters, Soviet Union

The three-place universal digital voltmeter B 7-35 is used for measuring DC and AC voltages and DC and AC current in resistive circuits. Selection of range and polarity for measurement of DC voltage and current, null point adjustment and calibration are accomplished automatically. The unit can be used under factory and laboratory conditions. It also has many uses in equipment servicing.

Photo caption: B-7-35 Universal voltmeter, Soviet Union

Technical Data

Range	
DC and AC voltage	0.1 mV to 1 kV
DC and AC current	0.1 μA to 10 A
Basic error of measurement for	
DC voltage	+/-0.1 %
AC voltage	+/-0.2 to +/-1.5 %
DC current	+/-0.3 %
AC current	+/-0.3 to +/-0.6 %
Input resistance and capacitance	
DC voltage measurement	10 MΩ
AC voltage measurement	9.3 MΩ, 130 pF
Power supply	line voltage, internal batteries (5.6 to 10 V)
Dimensions in mm	200 (170) x 70 x 227
Weight	2.2 or 2.3 kg.

The test-signal generator Г6-28 has proven itself as a test-signal source for trouble shooting, adjusting and check-out of equipment in the fields of automation, HF electronics and acoustics. At its main port, the unit outputs sinusoidal, triangular, square-wave and saw-tooth signals. Synchronous impulses are output at the adjacent terminal. The generator has an AM input and an input for remote control. Manual triggering is provided. Also available is a continuous phase adjustment of the oscillations of about +/- 75 degrees or a fixed phase adjustment of 0 degrees. The test-signal generator can be operated with matched 50 and 600Ω terminals.

Technical Data

Frequency range	0.001 Hz to 1 MHz
Frequency error	+/-1 to +/- 2 %
Amplitude error (50-Ω terminal)	
sinusoidal signal	+/-1 % and +/-6 %
square-wave signal	+/-2 %
triangular wave signal	+/-3 %
Output signal amplitude, max.	5 V
Steady damping of output signal	20 dB
Broadband output attenuation	
50-Ω terminal	0, 20, 40, 60 dB
600-Ω terminal	0, 10, 20, 30, 40, 50, 60 dB
Attenuator damping error	2 to 6 %
Distortion factor	
sinusoidal signal	1 to 3 %
triangle and saw-tooth signal	2 %
Rise time	60 ns

Ramp	+/-5 %
Power consumption	< 60 VA
Dimensions in mm	490 x 135 x 370
Weight	12.5 kg

The B-3-52/1 digital millivoltmeter is designed for measuring AC voltages from 1 mV to 3V in the frequency range from 10 kHz to 1 GHz or, with an external voltage divider, from 3 to 300 V in the frequency range from 100 kHz to 300 MHz under laboratory and factory conditions. The measured voltage is displayed as the effective [RMS] value of a sinusoidal voltage. The unit has an output for driving a recorder. The output information is in BCD and the encoded output signal is TTL compatible. Initiating the measurement process can be accomplished internally, periodically, synchronous with line frequency or externally.

Technical Data

Basic error of measurement	+/-2 to +/-4 %
Input impedance for voltage measurements	
with sampling head	100 kΩ (15MHz), 2.5 pF
without sampling head	100 kΩ (15MHz), 3.5 pF; 50 kΩ (100MHz), 3.5 pF
Dimensions in mm	153 x 206 x 297
Weight	5 kg

The B-3-48A millivoltmeter is provided as an analog instrument for measuring the RMS value of an AC voltage of complex waveform containing frequencies up to 50 MHz and for converting it into a DC voltage proportional to the RMS value. It is used for the measurment of broadband noise signals and in servicing, alignment and repair of a wide range of HF equipment. It can also be used as a linear converter for digital DC voltmeters.

Technical Data

Voltage measurement range	0.3 mV to 300 V
Frequency measurement range	10 Hz to 50 MHz
Basic error of measurement	+/-2.5 %
Input impedance	20 MΩ , 6pF
with voltage divider	(3+/-0.3)MΩ , 4pF
Rated value of transformer output voltage	1 V
Power consumption	20 VA
Dimensions in mm	155 x 205 x 297
Weight	4.5 kg

CSSR

The TV measuring oscilloscope MTO 11 is specialized for the accurate evaluation of basic parameters of the FBAS signals in the TV studio and for directional radio links and television transmitters in the development laboratory. It is a single-channel broadband oscilloscope with the capability of TV signal sampling and the selection of standard TV filters which enables the measurement of the bandwidth of the observed process aided by the simultaneous display of the signal components on

the screen. The evaluation is by digital methods. The oscilloscope permits rapid election of one or more lines, the selection of an arbitrary line of the chosen picture fragment or the selection of a specified measurement line. It also permits the simultaneous display of the area of the picture fragment-blanking interval for four sequential picture fragments. For observing sinusoidal or generalized processes, the oscilloscope is equipped with an adjustable triggering threshold.

Technical Data

Picture dimensions in mm	80 x 100
Vertical deflection input dividers	1:1, 2.5:5
Range of DC component compensation (divider 1:1)	+/-5 V
Frequency range	0 to 25 MHz (3 dB); 0 to 10 MHz (+/-0.3 dB)
Calibrated deflection coefficient	
magnification 1 x	0.2 to 1 V/spectral division
magnification 5 x	40 to 200 mV/spectral division
Increased sensitivity 10 x (4 mV/spectral division)	50 Hz to 6 MHz/+/-0.5 dB
Amplitude measurement	digital, 4-place
error from 0.7 to 1 V	+/-1 %
Calibrator	1 kHZ, sampling ratio 1:1, 1 V +/-0.5 %
Horizontal deflection calibrated sweep coefficient (steps 1:10)	0.1 μs/cm to 100 ms/cm (+/-3 %)
Video time base	H, 2H, 5H, 15H, V, 2V
Magnification X selectable	2 x, 5 x
X amplifier	
input (common with external synchronization)	1 MΩ ; 30 pF
frequency range	50 Hz to 2 MHz
deflection coefficient (magnification X 1 x)	0.5 V/cm
Synchronization inputs	1 MΩ ; 30 pF, 75-Ω throughput input
Polarity	+/- selectable
Universal synchronization	with periodic processes, level selectable
Power consumption	200 VA
Dimensions in mm	456 x 221 x 451
Weight	35 kg

Photo caption: MTO-11 measuring TV oscilloscope, CSSR

The TV signal generator GTS 11 generates measurement signals Nrs 1 through 9, the blanking pulses, the synchronization pulses and the horizontal and vertical pulses. With these, the following adjustments can be made:
-- video signal complete
-- synchronization pulses for line blanking

It can also be driven by external synchronization.

Technical Data

Output amplitude of measurement signal	1 V
Output voltage divider	-7 to +4 V

Output impedance	75
Reflection damping	34 dB
Synchronization pulse vertical and horizontal	(-2 +/-0.5)V
External synchronization	-1 to -3 V
External frequency	15,625 kHz +/-2.5 %
Pulse rise time	1 μs
Amplitude for external modulation	1 V
Frequency response up to 10MHz	+/-1 dB
Dimensions in mm	456 x 221 x 411
Weight	15 kg

Photo caption: GTS-11 video signal generator, CSSR

Polish People's Republic

The Type 1118 RC decade generator delivers sinusoidal voltages with extremely low distortion factors. Because of the decade frequency adjustment, the unit is especially well suited to circuits wherewith importance is placed on rapid and accurate resetting of the unit to the previously established output frequency upon completion of a series of measurements.

Technical Data

Frequency range	10 Hz to 109.9 kHz
Adjustment uncertainty	+/-0.5 %
Frequency instability	
short-term	+/-0.02 %/15 min or +/-0.01 Hz/15 min
long-term	+/-0.05 %/7 h or +/-0.05 Hz/7h
Output voltage (in 6 steps)	0 to 6 V
Total distortion factor	
10 Hz to 10.99 kHz	< 0.005 %
10 kHz to 50 kHz	0.02 %
50 kHz to 110 kHz	0.1 %
Output resistance	600Ω +/-2 %
Power consumption	10 VA
Dimensions in mm	90 x 314 x 334
Weight	4 kg

The Type KZ-1404 function generator is a source for sinusoidal, triangular and square wave voltages with a variable sampling ratio. The frequency and amplitude of any of these voltage functions can be modulated by an externally applied signal so that the generator can be used, for example, to plot the characteristic curves of the transmission systen and also to control the rpm in the case of electric motors.

Technical Data

Frequency range	0.05 Hz to 1 MHz in 7 bands
Frequency uncertainty	+/-3 %

Frequency instability	
short-term	+/-0.2 %/min
long-term	+/-0.5 %/7h
Frequency variation for a +10 % change in line voltage	≤ 1 %
Output voltage shape	(bipolar) sine, triangle or square wave with adjustable keying ratio and adjustable modulation ratio from -5 to +5 V
Output voltage U (no load)	0 to 10 V (SS)
Total distortion factor for sinusoidal voltage	≤ 5%
Nonlinearity of triangluar voltage	≤ 5 %
Asymmetry of triangular voltage	≤ 5 %
Power consumption	10 VA
Dimensions in mm	98 x 300 x 240
Weight	2.5 kg

The Type KZ-1405 function generator differs from the KZ-1404 in the following parameters:

Frequency range	0.01 Hz to 10 MHz
Uncertainty of adjustment	1 %
Output voltage (sine)	20 V no load, 10 V into 50Ω
Distortion factor	1 %

The Type KZ-1406 instrumentation generator consists of two independent generators which can be coupled together. The primary generator produces sinusoidal, triangular, square wave, and TTL signals. The three basic wave forms can be pulse and amplitude modulated. The voltage-frequency converter makes possible an external working frequency control; the frequency-voltage converter on the other hand enables a frequency measurement. By gating with external or internal binary signals, sinusoidal and triangular wave forms are produced individually or serially at the output of the primary generator. The secondary generator can produce sinusoidal, triangular, square wave and positive and negative ramp signals plus signals with various keying ratios.

Technical Data

Primary generator

Frequency range	0.0005 Hz to 100 kHz adjustable over 8 bands
Uncertainty of adjustment	+/-2 % to +/-5%
Frequency instability	
short-term	+/-0.1 %/15min
long-term	+/-0.2 %/7h
Output voltage U_{ss} (no load)	0 to 10 V
Damping	5 x 10 dB

Secondary generator

Frequency range	0.01 Hz to 10 kHz adjustable over 6 bands
Frequency instability(short term)	+/-0.3 %/15 min

Output voltage U (no load)	0 to 10 V (SS)
Power consumption	50 VA
Dimensions in mm	140 x 444 x 340
Weight	6.5 kg

The Type KZ-1508-A pulse generator is a laboratory device which produces via a quartz-oscillator controlled source electrical pulses with digital tuning of the repeat rate, pulse duration and calibrated amplitude. The full complement of outputs assures versatile application of the generator both in the testing of circuits and systems of TTL technology and in a broad series of studies in the domain of pulse technology.

Technical Data

Time relations	
for single pulses	0.2 μs to 99.9 s
for symmetrical square waves	0.2 μs to 199.8 s
Adjustment of the periods for single pulses and for symmetrical square waves	with digital switches
Accuracy of period, broad range	+/-0.02 %
Adjustment of width	with digital switches
Accuracy of width	+/-0.02 % +/- 15 ns
Power consumption	about 130 VA
Dimensions in mm	98 x 446 x 340
Weight	7.1 kg

The KZ-1622 signal generator is a laboratory unit which produces sinusoidal voltages with adjustable amplitudes in the range from 1 μV to 1 V. The output voltage can be amplitude modulated in the frequency range 50 kHz to 50 MHz or frequency modulated in the range 60 to 80 MHz. The unit is used for balancing radio units and electronic circuits in the range 50 kHz to 50 MHz and 60 to 80 MHz.

Technical Data

Frequency	50 kHz to 50 MHz, 60 to 80 MHz
Adjustment uncertainty	+/-1.5 %
Frequency instability	
short-term	+/-0.02 %/15 min
long-term	+/-0.10 %/3 h
Output voltage with matching	
50 kHz to 25 MHz	1 dB/1 μV
25 to 80 MHz	1.5 dB/1 μV
Source resistance	50 Ω
Nonlinear distortion at high frequencies	< 5%
Power consumption	18 VA, approximate
Dimensions in mm	175 x 440 x 367
Weight	13 kg

The 8-channel KZ-3307 logic analyzer makes possible in connection with a single-channel oscilloscope the analysis of logic conditions in 8 measurement channels whose inputs can be attached to outputs of an integrated circuit, to pins of a multicontact plug connector or to an arbitrary measurement point of the circuit to be tested. It is equipped with 11 conductors for extracting the signals from the circuit to be tested and for making power (5 V) and ground connections. In addition, there are 3 coaxial cables for connection the unit to the oscilloscope.

Technical Data

Frequency range	0 to 5 MHz
Input impedance	$\geq$ 390Ω + TTL gate input
Maximum input voltage	+/-15 V
Triggering voltage	TTL (+1.4 V)
Primary pulse input frequency range	0 to 500 kHz
Primary pulse source	oscilloscope time-base generator
Output voltage	+1.5 V +/- 20% (channels)
Logic signal Amplitude	90 mV +/- 20 % (1 channel)
Rise time of logic signal	$\leq$ 25 μs
Output impedance	< 750
Power supply	+4.75 to 5.25 V from the circuit to be tested
Dimensions in mm	66 x 32 x 37
Weight	200 g

The Type PGP-5A pulse generator is a two channel laboratory unit for generating single and double pulses of both polarities. Positive and negative pulses with independently adjusted amplitude and reference voltage are output from two separate ports. The unit can be used in scientific research laboratories and factories.

Technical Data

Time function

Frequency range with internal triggering by	
single pulse, square wave	0.5 Hz to 50 MHz
double pulse	0.5 Hz to 25 MHz
Frequency range with external triggering by	
single pulse, square wave	0 to 50 MHz
double pulse	0 to 25 MHz
Pulse width	10 ns to 200ms
Delay of the first pulse in relation to the first pulse in a double pulse	20 ns to 200 ms

Pulse data

Pulse amplitude (50Ω load)	150mV to 5 V
Output resistance	50Ω +/- 20 %
Rise and fall time	$\leq$ 5 ns

Pulse peak distortion (pulse tilt) and build-up and overshoot (50-Ω load)	≤ 5 % or ≤ 50 mV
Power consumption	130 VA
Dimensions in mm	76 x 444 x 340
Weight	6.5 kg

The AM-FM instrumentation transmitter PG 20 is designed for generating amplitude and frequency modulated sinusoidal voltages with variable amplitude and frequency. The output voltage can be amplitude and frequency modulated externally in the frequency range 20 Hz to 20 kHz. When used in conjuction with an oscilloscope, the frequency response curves of the circuits under test can be recorded.

Photo caption: PG-20 AM-FM Transmitter, Polish People's Republic

Technical Data

Frequency range	50 kHz to 102.4 MHz
Frequency setting uncertainty	0.005 %
Frequency drift	
short-term	+/-0.01 %/15 min
long-term	0.1 %/3 h
Output voltage (no load)	1 μV to 1 V
Setting accuracy of output voltage	
50 kHz to 20 MHz	1 dB +/- 1 μV
20 MHz to 102.4 MHz	1.5 dB +/- 1.5 μV
Reference frequency	1 MHz
Quartz crystal frequency drift	5×10^{-6}/24 h
Counter capacity	10^6 -1 (6 counter decades)
Power consumption	50 VA
Dimensions in mm	128 x 438 x 400
Weight	14 kg

The small and light OS-301 oscilloscope is especially suited for service work and classroom instruction.

Photo caption: OS-301 Oscilloscope, Polish People's Republic

Technical Data

Screen area	8 x 10 divisions (1 division = 6 mm)
Y deflection	
bandwidth	0 to 12 MHz, -3 dB
sensitivity	10 mV/division to 5 V/division
basic error	+/- 5 %
input impedance	1 MΩ, 25 pF
maximum input voltage	250 V
X deflection	
time base	0.1 μs/division to 50 ms/division
basic error	+/-5 %
trigger	AUTO/NORMAL, +/-, INT/EXT, LEVEL, sensitivity for INT- 3 mm

external X input	1 V/division, R_E = 100 kΩ
Z deflection	R_E = 1.6 kΩ; +3 V, screen not lighted
Power consumption	30 VA
Dimensions in mm	100 x 220 x 320
Weight	4 kg

The OS-351 unit is a portable two-channel oscilloscope which is suitable for laboratory and field-test work.

Technical Data

Screen area	8 x 10 divisions
Y sweep	
sweep type	channel A, channel B, ALT, CHOP, ADD /A + B/
bandwidth	0 to 15 MHz, -3 dB
sensitivity	5 mV/division to 5 V/division
basic error	+/-3 %
X sweep	
time base	0.1 μs/division to 0.5 s/division
basic error	+/-3 %
external x input	0.1 V/division to 0.5 V/division
Power consumption	45 VA
Dimensions in mm	216 x 362 x 520
Weight	12 kg

The ND-1481 instrumentation unit is used for measuring speed deviations and thus pitch deviations in tape recorders, record players and studio equipment, The unit makes possible additional frequency measurements up to 100 kHz. The display is part digital and part analog.

Technical Data

Input voltage	10 mV to 10 V
Frequency	3,150 Hz +/- 20 %, 10 Hz to 100 kHz
Input resistance	315 kΩ
Measurement of pitch deviations	
display	analog
range	0.03 to 3 %
Measurement of speed deviations	
display	digital
measurement range	-.001 to 9.999 %
measurement time	0.3, 3, 30 s
Frequency measurement	
measurement spectrum	10 Hz to 99.99 kHz
Dimensions in mm	150 x 230 x 315
Weight	3.5 kg

The PMZ-11 distortion factor indicator is intended for the direct measurement of the distoriton factor of voltage functions with a fundamental frequency of 20 Hz to 200 kHz. The distortion factor measurement is accomplished automatically; however manual settting of the input voltage level, a frequency and a corresponding harmonic distortion sub range is necessary. Also, frequencies in the range 20 Hz to 200 kHz can be measured.

Technical Data

Range of frequencies for harmonic distortion measurements	to 1 MHz
Distortion factor measurement range	0.3 to 30 %
Internal-voltmeter error (1 kHz)	+/-3 % of full scale
Damping of fundamental frequency	80 dB
Instrument distortion	0.04 %
Input voltage	300 mV
Frequency measurement error	+/-5 % of full scale
Input impedance	100 kΩ; 60 pF
Power consumption	14 VA
Dimensions in mm	142 x 300 x 340
Weight	6.5 kg

The small 545-LC ultrasonic test unit is designed for nondestructive, ultrasonic testing of parts. It is easily portable and makes possible the discovery of cracks and layer separations in metals, ceramics and plastics. Read out is digital. The power supply is assured by an internal battery. When used with 3 different transducers, the unit can measure up to 199 mm:

Range 1	0.1 to 12 mm
Range 2	10 to 60 mm
Range 3	50 to 199 mm

For this method of measurement, resolution is about 1 % and the measurement frequency is about 20 MHz.

Photo caption: 545-LC ultrasonic test unit, Polish People's Republic

Hungarian People's Republic

As was mentioned in the report on the 1983 Leipzig Spring Fair, the Hungarian foreign trade company Metrimpex exhibits electronic instrumention only in alternate years. This year, the primary products to be seen were controls-technology equipment.

The exception was the programmable vector voltmeter PVV-1, a new development of the MIKI Instrumentation Factory, Budapest. A few of its many uses are the following: determination of the amplitudes and phase angle of two applied voltages; waveform analysis; amplitude and phase angle modulation; measurement of rise and fall times of fast pulses and stability testing of amplifiers.

Through the sampling process, the two applied HF voltages are completely transposed with true phase into LF signals of 20 kHz. In the case of slowly changing frequency, an automatic control provides continuous retuning of the input voltage and maintains the bandwidth of the evaluation circuit at 1 kHz. Voltage and phase angle display is digital.

Technical Data

Frequency range	1 to 1,000 MHz
Voltage range	20 μV to 1 V with divider 100:1 correspondingly expanded

Input impedance	100 k ; 2.5 pF
Dislay (voltage)	3.5 places
Bandwidth	1 kHz
Measuring time	10 ms
Display (phase angle)	3.5 places
Measuring range	+/-180 deg
Phase angle error	+/-4 deg
Dimensions in mm	450 x 430 x 210
Weight	15 kg

Photo caption: PVV-1 programmable vector voltmeter, Hungarian People's Republic

Republic of Cuba

Of special interest are without doubt the various instrumentation devices which were exhibited at the Cuban Collective booth since Cuba does not have a long tradition in the development of electronic equipment. It is especially noteworthy that they were not timid in presenting their wares for international comparison.

With the stabilized DC power supply FER-23, a voltage of 0 to 25 V and a current of 0 to 1 A can be generated and held within the following tolerances: voltage drift 0,5 %, current drift 0.1 % and residual ripple 0.01 V (PP). It exhibits high reliability in the operational parameters and has thermal and short circuit protection. Internal resistance, 0.01 ; maximum power, 56 W; dimensions in mm, 115 x 105 x 210; weight, 2.4 kg.

Photo caption: FER-31-V, current and voltage source, Republic of Cuba

Photo caption: EQ-401 conductivity measuring unit, Republic of Cuba

The stabilized DC power supply FER-24, which incorporates integrated circuits, was designed for automatic control of current and voltage. It can deliver two separate voltages of 0 to 25 V at currents of 0 to 1 A with a total power of 112 W. The values for drift, residual ripple and internal resistance are the same as for the FER-23. Dimensions in mm, 155 x 175 x 210; weight, 3.75 kg.

Ideal for use in analyses and electrophoresis is the stabilized current and voltage source FER-30A which can generate a voltage of 0 to 500 V and a current of 0 to 50 mA. The functional modes are constant voltage, constant current or automatic. Maximum power, 55 W; dimensions in mm, 115 x 210 x 210; weight, 2.7 kg.

The FER-31V unit is a triply stabilized current and voltage source with a digital display. Each of these sources can be used for measuring current and voltage; and the unit can be used independently as a digital voltmeter. The unit outputs a voltage of 0 to 20 V with a drift of 0.05 % and a current of 0 to 250 mA. The residual ripple is 2 mV PP. This DC source can be advantageously employed in research, electronics and teaching laboratories.

The instrumentation unit CS-10 makes possible the digital measurement of small time intervals in the range 0 to 99.99 s with a resolution of 0.01 s. Dimensions in mm, 217 x 76 x 174; weight, 1.3 kg.

The conductivity measuring unit EQ-401 was developed for measuring the conductivity of solutions. Balancing capability is provided for various cell sizes.

The display is analog and temperature compensation is manual. Maximum power, 7 W; dimensions in mm, 225 x 175 x 190; weight, 3 kg.

Development Trends

The featured exhibit at the booth of Rhode and Schwarz, FRG, was a measurement station for microcomputer-controlled network analysis from 10 Hz to 2 GHz. The heart of this installation is the ZPV vector analyzer which was listed as a new development. In its basic function it is the same as a vector voltmeter with two measurement channels which selectively measure amplitude and phase. Its built-in microprocessor greatly simplifies complex measuring processes since it displays the measured parameters in any desired form after conversion.

Three different tuning modules enable accurate measurements in the frequency ranges 10 Hz to 50 MHz, 100 kHz to 1 GHz (1.2 GHz) and 300 kHz to 2 GHz.

All functions of the ZPV are programmable; all modes of operation of the unit can be set and all measured values read out via the IEC bus connector. A complete phase and amplitude measurement takes 35 ms. The peripheral ZPV-Z5 test adapter enables the automatic measurement of all s parameters without changing the test set up. The measured results can be presented in linear or logarithmic, absolute or normalized or polar or cartesian form. The display can be analog or digital. Additional presentations can be made by using the control computer with a built-in display and line printer.

Other equipment besides the ZPV vector analyzer and the ZPV-Z5 test adapter which makes up the complete computer-controlled network analyzer includes the SWP sweep generator, the PUC and PPC process controllers and the basic programming software package. All equipment items are IEC bus compatible and are freely programmable in all their functions.

Photo caption: Microcomputer controlled network analyzer, FRG

9160
CSO: 2302/3

COMPUTER EQUIPMENT AT 1984 LEIPZIG SPRING FAIR

East Berlin RADIO FERNSEHEN ELEKTRONIK in German Vol 33 No 7, Jul 84 pp 430-463

[Article by V. Loeschner, B. Kasper]

[Text] GDR

In the LC 80 training computer, the VEB Mikroelektronik "Karl Marx," Erfurt, has developed a single-board microcomputer which is intended primarily to aid pupils, students, BMSR mechanics and others interested in microprocessor technology in becoming familiar with the components and programming of the U 880 microprocessor system. The monitor program of about 1.5 kbytes is stored in two U-505-D ROM circuits of 1 kbyte each or in a single 2-kbyte U-2716-C EPROM. The second EPROM receptacle is empty. Available as the working memory is a 1-kbyte RAM with 2 U-214-Ds. Keyboard, cassette interface and display control is accomplished via 2 U-885-D PIOs; and associated therewith, 12 I/O lines are freely accessible to the user via a pin plug. The U-857-D CTC circuit was also provided for free access. Of the 25 keys, 16 are for data input, 7 are function keys and 2 provide for interrupt and reset. Information is presented on a 6-place LED display; acoustical output is also possible. A cassette interface located on the circuit board makes it possible to store programs externally. Hardware expansions can be effected via the pin plug provided. The LC 80 converts program input into machine language and programs peripherial components. Further, the system can be used for control, regulation and game playing, including very simple acoustic and musical games. The required power supply is 9 to 12 V DC at 500 mA. Dimensions: 200 x 300 mm.

The VEB Applikationszentrum Elektronik in Berlin developed the prototype of a scientific-technical small computer qpc-2 which automated for the first time the conversion of mensuration units. The computer is based on an 8-bit microprocessor system and contains a 1-kbyte RAM, a 14-kbyte ROM, 5 parameter registers, a 3-level stack, an alphanumeric keyboard and a 16-place display. Errors are announced by a wrap-around text display. The qpc-2 operates in one of two modes: as a nonprogrammable scientific-technical large computer with 20 basic commands or as a programmable computer. In the latter case, 4 modes of operation are possible: programming, editing, iterative and closed-form program execution. In programmable mode it has 12 control and 22 basic commands. The size of the software package for numerical processing (excluding monitor and arithmetic) is 8 kbytes. The computer carries out operations on units alongside operations on numerical quantities. Depending on the version of the program package, about 100 to 200 different mensuration units can be accommodated, including all SI, valid incoherent, obsolete technical and selected Anglo-American units which can be processed together in any combination. The output results are in SI units.

The home computer HC 900 was developed by the VEB Mikroelectronik "Wilhelm Pieck," Muehlhausen, for a wide range of applications in such areas as home, hobby, university, technical academy, training, and design and development departments. It is based on the U 880 microprocessor and has a 4-kbyte ROM plus a 32-kbyte working memory, with 16-kbytes being freely accessible for applications. With the HC 900, 320 x 256 pixels can be individually programmed and displayed. An ordinary TV set can be used as a display device. For color displays, 24 colors are avaliable to the user, 16 of which are for foreground and 8 for background. For the video interface, a UHF and a RGB connector have been provided. A cassette recorder and an expansion interface can be attached externally. The programming languages are BASIC and U-880 assembler. Many expansion capabilities are planned for the HC 900, but only a few will be mentioned here: the joystick, the light pen, the BASIC interpreter, a 16-kbyte and a 64-kbyte RAM and an EPROM programmer and EPROM eraser. Also contained in the basic equipment are learning and practice programs of graded levels of difficulty for basic computations, fractions and percentages and game programs. The basic unit has a flat profile and a nonintegral alphanumeric keyboard.

The Z-9001 home computer exhibited by the VEB Kombinat Robotron, Dresden, has already been described in detail in volume 3 of this year; therefore we will not describe it further in this report on the fair.

For applications in CRT terminals, office computers, data stations and data acquisition and information systems, hard copy printer K 6312 is provided. Plug-in control modules make possible a variable character set: That is, a selection can be made between normal, wide, slanting and compressed characters. At a printing speed of 100 characters/s, each line has 80 or 132 printing positions. A print trace optimizer provides for maximum printing speed.

Another member of the series K 6310 dot matrix printers is the table-top printer K 6316 which can be employed as a cabinet module or a desktop unit in terminal systems. With it, single- or dual-sprocket-driven endless paper can be printed and separated; roll paper can be fed stepwise and printed; and manually fed, automatically positioned indivdual forms, cards and form sets can be stepwise transported and printed. Printing speed is 100 characters/s and printing capacity can be varied between 80,100 and 120 characters per line. Font selections are normal, wide and slanted. Due to its applications oriented, integrated form handling design features, the printer is especially suited for use in banks, savings and loans and postal service windows.

The 80-place thermal printer K 6304 is a nonmechanical, alphanumeric printer which works on the principle of serial column printing. It can be supplied as a mechanical subsystem or as a desk-top printer. In contrast to conventional thermal printing technology, it is possible with this printer to print on thermal reaction paper as well as on thermomelt roll paper. The output media can be single page paper in format A4 and roll journal. Printing speed is 30 characters/s with a printing capacity of 80 characters/line. The character set can be varied via a changeable character generator module. The printing style is column mosaic. The printer is especially suited for use in home, micro, and personal computers and in CRT text systems.

For rationalizing preproduction and production processes, new CAD/CAM systems were developed. The A-6454 design and engineering work station facilitates computer-

based generation of drawings, engineering of machines and facilities, programming of NC machine tools, and design of individual parts. The K-1630 microcomputer with an arithmetic processor and a working memory of at least 128 kbytes is used as a controller. In addition to the typical standard peripherals, the system is rounded out with the RSG-K-8917 raster viewing unit, the Digigraph 1208-3.5G plotter, the HDG-K-6401 high-resolution digitizing unit and other units. Highly developed system software specially tailored for graphic and geometric support enables easy and rapid adaptation of the unit to the numerous processes of design, project engineering and technology.

The drawing board oriented design work station A 5510 is an applications complex for the digitizing work station. It consists of the office computer BC A 5120/30, the HDG K 6401 and the serial printer SD 1157/269. As a result of single stylus control, the printer is suited for graphic output. With this equipment group the routine processes of drawing can be simplified and accelerated since drawing structures are available on machine-readable data carriers and can be added to or changed on drawings as required. Drawing data can be stored and reproduced at any time.

The A-5601 high resolution digitizing unit is a microprocessor controlled graphics work station. It consists of the MRES-A-5601 microcomputer system and the digitizing table. The resolution of the measurement system is 0.01 mm. Dimensions of the working surface: 890 mm x 1,300 mm.

As an extension of a proven line of bookkeeping and invoicing equipment, the electronic invoicing and bookkeeping machine EFB 1715 was exhibited. It consists of a central computer unit with a RAM memory of 16 to 32 kbytes, a 2-kbyte ROM, a keyboard and a CRT display with a picture field of 64 characters x 16 lines (upgradable upon customer request to 80 characters x 24 lines). Additional equipment includes a maximum of 2 minifoil storage units and various printer variants. A powerful software package consisting of MABS K 1520, BASIC interpreter and PASCAL compiler provides a very flexible system structure.

Many application possibilities are offered by the improved microcomputer system MC 80 from VEB Elektronik Gera. They are used as full graphic control units for laboratory and field test installations, as test and initial exercising units in developing and testing microprocessor-controlled devices and as programming devices for generating software and storing it on EPROMs or digital cassettes. A CRT with 25 x 80 characters or 256 x 512 points is used for data display. Also available are a keyboard, an EPROM programming and erasing unit and a digital cassette recorder with a capacity of 128 kbytes per side.

Soviet Union

ESER computer sysems with associated peripherals and small computer systems were offered by the Soviet foreign trade company Elektronorgtechnika.

As a new development, a model of the ESER series 3-EC-1036 computer was displayed. Its range of uses includes scientific-technical problem solving, data processing, and special applications. The very powerful hardware consists of the central processor unit with a speed of 400,000 instructions per second, a memory with a capacity of 2 to 4 Mbytes and 5 channels (1 byte-multiplex channel, 4 block-multiplex

channels). Extensive provisions for microdiagnostics assure high reliability as well as short error search times. The entire array of peripherals associated with the ESER series can be connected to the system

In addition, the newly developed parallel printer EC-7036 was shown. With a cell width of 132 characters, it achieves a printing speed of 800 lines/min. As a result of a built-in data buffer for 132 characters, a data transfer speed of 250 kbytes/s from the channel is achieved. The printer can be connected to all central processing units of the ESER series.

The CM-1600 small computer system represents a dual processor system in which one processor is designed for processing alphanumeric data of variable string length. Both processors work in full parallel into a common working memory with a capacity of 256 kbytes. The associated equipment includes magnetic disk and magnetic tape storage, punched tape equipment, printers, CRTs, etc. A well developed instruction system including floating-point arithmetic coupled with a comprehensive software package assures high system efficiency. The standard operating systems OS RV, DOS KP, DIAMS and RAFOS contain the programming languages FORTRAN, BASIC, PASCAL and COBOL. To this is added a comprehensive program library for data management.

CSSR

The most recent development of the CSSR in the field of small computers is the CM 52-11. It extends the systems of the CM 3-20 and CM 4-20 series and is fully upward compatible with them, and existing programs can continue to be used. A broad spectrum of 139 instructions, including floating point arithmetic with single and double precision, plus a comprehensive software package provides for a wide range of applications. The working memory has a capacity of 128k 16-bit words. A cache memory of 1k words speeds access to instructions and data. The 4-level priority interrupt system, automatic reboot after power failure and multiprogramming capability perfect the universality of this computer system. For scientific-technical applications, a special asynchronous parallel processor FPP is available which greatly increases the speed of arithmetical operations. The DCS module makes possible fault detection and localization down to a circuit group; thus, it enables very short fault search times. All equipment items of the Small Computer System, such as disk drives, tape drives, printers and/or displays, can be connected to the CM 52-11 via the common bus. The broad range of applications possibilities is simplified by the FBOS, DOS RV V2 and DIAMS 1 operating systems, special program systems for controlling the SYRPOS computer network, programs for the SMGRAF graphic display and compilers for the programming languages FORTRAN IV, FORTRAN IV-plus, BASIC, BASIC-plus and COBOL.

Also shown by the CSSR was a further development of the proven Digigraf 1208-3.5 G, the graphic output unit Digigraf 1208 A/3.5 G (ESER-Chiffre EC 7907). It is a programmable drawing machine with its own processor controller which can be connected to ESER series-2 computers and also to the Small Computer System. Autonomous operation is also possible when operating with a punched-tape reader or a magnetic tape storage unit. In comparison to its predecessors, the Digigraf 1208 A/3.5 G has twice the operating speed, consumes less than half the power and possesses greatly improved logic. The usable drawing area is 1,189 mm by 841 mm and the maximum drawing speed is 700 mm/s. Available as special attachments are 2-pen and a 4-pen writing heads, an engraving head and a cutting head.

The basic software consists of a library of subprograms which accomplish the basic graphic functions and which can be directly accessed with commands from the computer or the control unit. Additional user programs--such as STR for the computation and execution of mechanical drawings, INS for computing and drawing municipal wiring networks and MIO for drawing or engraving IC masks--support rapid application without the expenditure of extensive preparation time.

Peoples Republic of Hungary

As a further development of the low end of the ESER line, Videoton exhibited the EC 1011/C. By expanding the arithmetic unit with decimal computing instructions, the instruction set was made more complete. By adding a cache memory and reworking the processor, operating speed was increased considerably. Main memory capacity is 1 Mbyte. The system peripherals are controlled via direct links.

In addition, the computer can be linked with various systems and can be operated in time-sharing mode. Programming effectiveness is increased by the use of highly developed operating systems along with standard programming languages: MAS (macroassembler), FORTRAN IV, RTL, COBOL, BASIC and MAG (macrogenerator).

Presented as a new development was the VDN-52578 data display unit. It consists of a base with a swiveling screen and a keyboard with an adjustable tilt angle. Character presentation by a matrix of 10 x 16 points assures high resolution. The character generator has the capability of generating all the characters used in the European countries or it can be modified to do so. The CRT capacity is 24 + 1 or 32 + 1 lines. The keyboard uses Hall generators and has 87 keys. The data viewing unit can be directly connected to various internationally used control units via a coaxial cable with a maximum length of 1,500 m. It serves for inputing, interrogating and modifying data and is therefore useful in program development and as a special data station. Built-in test sections simplify diagnosis.

The SLK-80 falls in the personal computer class. The basic equipment items are the CPU and the keyboard. A TV unit serves as a data display, wherewith a color controller significantly increases the application spectrum. Attachable via special retrofittable plug-in units are a maximum of 16 floppy disk drives, 8 cassette tape units and modems for remote data transmission. The CP/M 2.2 operating system in combination with a BASIC compiler makes for a comfortable operator environment and easy programming.

By the Hungarian foreign trade company Metrimpex was presented the PP-01 PROM programmer; with it, the most widely proliferated PROM types (P 2704, P 2708, P 2716, P 2723, P 8755) can be programmed. The basic unit is a microcomputer-controlled small computer equipped with a hexadecimal display, a keyboard and a fast punched-tape reader interface. Via the keyboard and row display, simple corrections can be made to the programs. Two programming modules realize the hardware conditions for the PROMs. Individual PROMs can be programmed; but also the data of a master PROM circuit can be copied onto 4 additional PROMs. Also offered are erasing units for EPROMs. Dimensions: 500 x 300 x 180 mm; weight, 8 kg.

Peoples Republic of Bulgaria

The capability of the Bulgarian industry was demonstrated by a wide offering of Magnetomotoric storage units as well as a broad array of display systems and printers. The EC-8566 is a complex of programmable display and printer terminals. It consists of a system control unit EC 8566.A 010 with a built-in display terminal, the display terminal EC 8566.A 020, the printer terminal EC 8566.A 030, the keyboard EC 8566.A 040, the light pen EC 8566.A 050 and a magnetic card reader. Attachable to the control unit are a maximum of 7 additional terminals. They are connected via a data transfer processor EC 8371 with the channels of various ESER computers. The individual terminals can be displaced up to 1,000 m from the control unit.

The display terminals have a screen capacity of 24 lines of 80 characters or 32 lines of 80 characters. The individual characters consist of a point matrix of 7 x 9 elements. Various editing capabilities such as formatting, field erasing, data tabulating and input and erasing of data contribute to universal application. Hard copy can be made with the printer from displayed data or directly from computer-stored data. Printing is accomplished via a typing wheel, resulting in a clear image and an output speed of 30 characters/s. Various print wheels are provided for printing Cyrillic and Latin characters as well as large and small letters. EC-8566 processes are supported by the OC-6.1/VS operating system. The VTAM access method is used. Internal and external test systems guarantee high reliability and easy servicing.

A further development of the minidisk storage series is represented by the ISOT CM 5412 unit which is provided for the Small Computer System. It has a maximum storage capacity of 80 Mbytes and an average access time of 45 ms. The data transfer rate is 1,209 kbytes/s, or, at lower turning speed, 806 Kbytes/s. The presentation of a wide range of accessories like magnetic disk stacks of various forms and magnetic foils round out the picture of the exhibit.

The Peoples Republic of Poland

At the center of the Polish offering stood the CAMAC data acquisition and control system. The various components are housed in a standard drawer and linked by a standard bus. A MERA 125/SM-4 A is used as the central computer. It uses the Small Computer System instruction set. The semiconductor working memory has a capacity of 32k words. The system is completed by adding rack inserts containing magnetic disk drives, magnetic tape drives, magnetic foil storage units and a series of control modules. Also, display stations, various printers and a number of other devices can be attached via modules for standardized interfaces. A comprehensive system software package consisting of the real-time operating system DOC PB 2 with the MACRO macroassembler, the FORTRAN-4 compiler, the TOC test system and a BASIC interpreter enables the computer to be readily adapted to special applications requirements.

Further, a series of small printers is offered. A new development is represented by the D-100, a matrix printer with a speed of 100 characters/s. The printing head consists of a 7 x 7- or a 7 x 9-point matrix. It can print 64 or 256 different characters. Printing widths of 80 or 132 characters per line combined with horizontal and vertical tabulation capability offer good application potentials. Several paper configurations--rolls with or without perforations, Leporello--can be used. The printing head permits up to three copies.

The D-180 achieves a printing speed of 180 characters/s. The printing width is 132 or 158 characters/line. The matrix printing head works with a 9 x 7-point matrix. A built-in buffer for 256 characters permits a data input rate of 8,000 characters/s. It can be linked with a variety of systems via standard interfaces.

The D-200 is a universally applicable small printer for data terminals and small computers. Driven by a microprocessor controller, the 7 x 9-point matrix print head can form a wide variety of character styles as well as graphic output. Electronic tabulating in the vertical and horizontal directions rounds out the broad spectrum of applications. The built-in buffer holds one line.

Socialist Republic of Romania

Exhibited was the microcomputer Independente 102 F which can be used as a circuit board design system. Under control of the program package DIAGRAM 2030 graphics and supported by a high-resolution graphics output screen, circuit board design can be highly rationalized.

The CRT terminal DAF 2015 was presented as a new development. It can be connected to a variety of computers by a direct link up to 30 meters and by modem in the case of long distances. The CRT has a capacity of 24 lines of 80 characters. The character set consists of 95 characters for which various presentations can be selected (inverse presentation, various degrees of brightness, etc.). The keyboard contains 80 keys which can be subdivided into the alphanumeric, numeric and function key groups. A well designed cursor control simplifies the various editing functions on the screen. The CRT can also output to a printer.

The TPD data collecting station supports data acquisition. It can accommodate a maximum of 5 foil memory drives. The input data can be prepared for further processing by the built-in 64-kbyte microprocessor system. A printer can be attached; and an add-on graphics package is available. The accompanying software package contains the CP/M operating system and a BASIC compiler.

Development Trends

In the field of desk and office computers, the products of the Epson Company are a determining factor. this is true not just for the computers themselves but also for the large number of peripheral devices. An example is the QX-10 office computer which together with the HX-20 hand-held computer represents a universal data acquisition and data processing system. The foundations of the QX-10 are the 8-bit Z-80-A microprocessor system and the CP/M operating system which enable full utilization of the 256-kbyte working memory. Two built-in 5 1/4-inch floppy disk drives, each with 320 kbytes of storage capacity, serve as a mass storage medium. Graphic resolution capability is 640 x 400 points. Owing to its small dimensions (290 x 215 x 44 mm) and its light weight (1.6 kg), the HX-20 is an ideal desk-top and portable computer.

As an 8-bit computer it has a 32-kbyte ROM (expandable internally to 40 kbyte) and a 16-kbyte RAM. Also, Both memories can be further expanded externally. The HX-20 possesses a 4-line LCD graphics display and a standard-paper printer with 24 characters per line and graphics capability. A plug-in cassette drive serves as program memory. The power supply is provided by a built-in rechargeable NiCd bat-

tery. The two units [QX-10 and HX-20] can be linked via an acoustic coupler over a distance of several hundred kilometers. A telephone line is then used for distant data transmission.

Another peripheral unit is the P-40 thermal printer with graphics capability which can be attached to many personal computers. With it 20, 40 or 80 characters/line can be printed out at a speed of 45 characters/s. Line spacing can be 1/9 or 1/6 inch. In contrast to other printers, the P-40 is capable of printing 480 points per line. Samples of character size and style are shown in the printed sample above [omitted herein]. Also, the thermal printer has an automatic selftest feature. It is powered by NiCd batteries which guarantee a maximum operating time of 6 hours. Dimensions: 46 x 216 x 128 mm; weight: 0.7 kg (without paper).

Figure Captions (In order of occurrence top to botton, left to right)

1. Scientific-technical large computer qpc-2, VEB Applikationszentrum Elektronik Berlin
2. Home computer HC 900, VEB Mikroelektronik "Wilhelm Pieck" Muehlhausen
3. Learning computer LC 80 VEB Mikroelektronik "Karl Marx" Erfurt
4. Hardcopy printer K 6312, VEB Kombinat Robotron Dresden
5. Thermal printer K 6304, VEB Kombinat Robotron Dresden
6. Electronic invoicing and bookkeeping machine EFB 1715, VEB Kombinat Robotron Dresden
7. Microcomputer system MC 80, VEB Elektronik Gera
8. Small computer system CM 1600 Soviet Union
9. Computer system EC 1011/C, Hungarian Peoples Republic
10. Graphic output unit Digigraf 1208 A/3.5 G
11. Data viewing unit VDN 52578, Hungarian Peoples Republic
12. Suite of programmable display and printing terminals EC 8566, Peoples Republic of Bulgaria
13. PROM programmer PP 01, Hungarian Peoples Republic
14. Personal computer SLK-80, Hungarian Peoples Republic
15. Matrix printer D-100, Peoples Republic of Poland
16. Matrix printer D-180, Peoples Republic of Poland

9160
CSO: 2302/3

BRIEFS

CSSR MANUFACTURES FIRST MAGNETRONS--Progressive technologies that coat the surface of parts under the greatest stress with highly resistant layers have made it possible to expand the useful life of machine parts and tools by 200 to 300 percent. Successful results in research on these problems have been achieved by the Plasma Physics Institute (UFP) at the Czechoslovak Academy of Sciences in Prague. Among the materials which meet the requirements of protective coating is, for instance, titanium nitride. It is sprayed on the spot where needed with an appliance called a magnetron. Our scientists have succeeded in designing this modern technology and developed the first line of Czechoslovak magnetrons in the UFP Applied Plasma Physics Laboratories at the Czechoslovak Academy of Sciences. The parameters of this equipment are comparable to current world products; moreover, it was made exclusively from components manufactured in this country. With its aid mutual relations between the conditions during the spraying of the coating, the rate of growth of nitride layers and their properties are being studied. Thin layers of titanium nitride were successfully sprayed, for example, on the cutting edge tip and girders for the extrusion of hard-metal wire. Test runs have confirmed that this method may realistically double and even triple useful life. [Text] [Prague RUDE PRAVO in Czech 3 Dec 84 p 1] 9004

NEW LUNG EXAMINATION METHOD--The physicians of the university hospital in Plzen have expanded the current methods of lung examination to include the so-called ventillation scintigraphy, based on scanning of the lungs filled with a radioactive gas or aerosol. However, to introduce those substances into the respiratory tract of persons undergoing the examination they do not use imported equipment but an appliance which they themselves constructed and tested and which, unlike foreign products, has universal application. The patient does not have to be transferred to different laboratories for observation of the function of his lungs at rest and at the same time for a study in motion (during exhalation and inhalation). In a single sitting all that is needed is to switch the valve from the aerosol circuit to the gas circuit. From the picture produced by the scintillograph (sensitive to gamma rays) the location and the extent to which the medium could not penetrate, for example, because of a bronchial obstruction, may be accurately pinpointed. This unique product, which is protected by a certificate of authorship, was designed by the technicians and physicians in the Department of Nuclear Medicine of the university hospital exclusively from components manufactured in our country. It helps determine the function of the respiratory organs in children as well as in

patients in supine position. At the same time, the radiation charge is 20 times below that used in x-ray examination. [Text] [Prague RUDE PRAVO in Czech 3 Dec 84 p 1] 9004

CSO: 2402/5

GERMAN DEMOCRATIC REPUBLIC

NEW OPTOELECTRONIC COMPONENTS FOR MACHINE CONTROL DEVELOPED

East Berlin BERLINER ZEITUNG in German 24-25 Nov 84 p 3

[Article by Rainer Schmid]

[Text] It is the beginning of this year: with the greatest urgency the GDR machine construction industry is calling upon the Television Electronics Plant to supply new couplers of a specific type. These important optoelectronics components regulate vital functions in machine controls. In one of the letters to the WF [Television Electronics Plant] it was stated that upon the quick solution of this problem depended the competitive capability of many machines on the world market.

The television electronics engineers had already demonstrated many times in recent years that existing time limits do not remain applicable for eternity. They had reduced development times from an initial 36 months to less than 2 years. But today internationally a period of 6 to 9 years represents the peak achievement. It was a similar time schedule that the machine construction combines set for the electronics people. It was a large challenge.

"In this situation we once more became conscious of the great responsibility which we as the optoelectronics center of the GDR bear with respect to the entire national economy. The need to become reliable partners in this concrete instance was in the last analysis also a political task which calls for our full involvement. Finally, there is the fact that machine construction is a kingpin of our export activity. Its ability to react quickly to new demands and to supply export products profitably is essentially influenced in part by us suppliers."

The speaker is an advanced school instructor at the Humboldt University in Berlin and chief of the semiconductor division for semiconductor development in the WF. Three days a week Prof-Dr Sc Guenter Heymann is in the plant; the rest of the time he is teaching in the electronics section. An occupational double life which he has been leading for 4 years--to the great profit of both sides of his activity. This arrangement may also be expected to pay off for the new fast-tempo task.

At the previously conventional pace of development it would not have been possible to bring a new component to the stage of production in the required short period of time.

"It was our main idea, in contrast to previous practice, at the very moment of delivery of a new component to commence at once to develop it further," explains Prof Heymann. He said that this is generally international practice and that "model nurturing" is steadily becoming the general rule. "And that must also become a matter of course for us. I mean it should become a normal feature of research. Besides this is the most important way in which the intensification of production can be carried out with the highest degree of continuity, to endow it with permanency. Thus, as is generally the case internationally, annual innovation rates of 30 to 40 percent should be assured," he adds.

It was exactly in this respect that the advantage of close cooperation between the WF and the Humboldt University has been apparent. On the basis of their fundamental research in optoelectronics it has been possible to use scientific advances in industry without detours. And this also gave a boost to the "new MB 102 coupler" development project.

The active agent in this transfer phase was Prof Guenter Heymann. "Our discoveries have never before been so rapidly carried over into practice. It is now our desire in this way to translate generally a much larger fraction of our basic research results into industrial projects."

At the same time the developers in the WF in close partnership with the Pankow manufacturing sector sought for ways of producing the new components on existing high production automatic machines. This would yield a significant increase in productivity.

"Our idea of building as extensively as possible on existing technologies turned out to be the right way to meet the demands of the machine construction industry. It is now possible to manufacture the new coupler elements in large quantities. This lowers costs substantially," explains plant submanager Juergen Wernicke who manages the research collective jointly with Prof Heymann.

The production of the latest optoelectronics components began in November. Thus, up to that point, only 8 months had expired. And this result fares well in any international comparison: twice the dielectric strength combined with higher sensitivity as well as greater reliability characterize the MB 102 coupler. Already 7,000 of them have been produced and made available to the machine construction industry.

While the production collective is still striving to increase the production figures to 25,000 by the end of the year, the development collective headed by Guenter Heymann and Juergen Wernicke, faithful to its self-set goal, is already taking the next step. They want to confer upon this new product additional quality features still not even asked for by the users. They don't intend ever again to wait until there are calls for help. Because in optoelectronics, a branch of microelectronics which is essential to progress, international development is taking place at a truly explosive tempo. Almost daily new applications are being found for the tiny infrared diodes and phototransistors which are constituents of a coupler. At such a tempo the "moral wear and tear" of optoelectronic components is extraordinarily high and development

times are steadily getting shorter. In 1984 the Television Electronics Plant has once again engaged in its proven cooperation with the Humboldt University to share in maintaining this tempo.

Figures and Facts

Micro-optoelectronic components, manufactured primarily in the GDR by the Television Electronics Plant in Berlin, are used in almost all areas of the national economy. They convert electronic signals into optical signals and conversely. The spectrum of models includes amongst other things signal lamps (LED), information displays, picture reproduction sensors and picture recording sensors as well as components for radio transmitters, radio receivers and couplers (SEK).

The 2- to 5-mm coupler elements which operate in the infrared invisible light range serve to control and regulate motion processes in the production of industrial products and consumer goods. With their aid, for example, machine tools and cassette recorders can be automatically switched, television sets can be operated remotely and electrical potentials of several thousand volts can be reliably disconnected.

From 1975 to the present more than 100 optoelectronic components have been developed in the WF and have gone over into production.

8008
CSO: 2302/52

BRIEFS

NEW POWER METALLURGY FACILITY--At the end of this year the two Siemens-Martin furnaces are being shut down in the steel works of the Thale Iron and Foundry Plant. But the steelworkers are not worried about getting interesting new jobs, according to assurances given by plant manager Walfried Hoppe. Nevertheless, the new production methods will oblige many workers to return to the schoolroom. Each steelworker has been and is now being interviewed and attention is being given to his personal problems and interests. Fifty-eight colleagues have already taken up a new activity, some of them also being employed in the nearby sheet metal rolling mill. The Siemens-Martin process in operation in Thale since the turn of the century is obsolete. Therefore the out-of-date facilities must be replaced. The replacement is to be an expansion of powder metallurgy. This can yield significant material-economic effects in the national economy and in this area the operation in Thale figures among the pioneers in the GDR. When compared with other technologies the technique of pressing workpieces out of iron powder is seen to render substantially all subsequent machining unnecessary. The parts receive their final form during the pressing. The increasing use of pressed parts in the construction of machines, cars and textile machinery as well as in the office machine and electrical appliance industries and in yet other branches naturally requires the large-scale production of iron powder. Therefore a new installation is being set up in the Thale steel plant for this purpose. It will obtain the requisite molten metal from the plant's existing electric smelting furnaces. For the collective of workers here this means opening up unexplored areas of technology. At the present time they are collecting initial experience in a smaller facility which the steelworkers together with specialists in industrial rationalization created within 6 months. By this process they have thus far produced iron powder low in phosphorus, sulfur and oxygen which already meets specifications for the pressing of welding electrodes. [By Wolfgang Radeiski, ADN] [Text] [East Berlin BERLINER ZEITUNG in German 24-25 Nov 84 p 3] 8008

CENTER PRODUCES MACHINE CONTROLLERS--Erfurt. The VEB Erfurt Electronics "Friedrich Engels" Plant has set up a small production center for microelectronic controls. There in the future controls will be designed and manufactured for newly developed pressing machines and plastics machines of the Shaping Technology Combine. At the same time this center permits the rapid production of controls meeting the special purpose of the user. Thus it becomes possible to respond more speedily to the customer's wishes. [Text] [East Berlin BERLINER ZEITUNG in German 29 Oct 84 p 3] 8008

LAB FOR WELDING AUTOMATION--The "Otto von Guericke" Technical Advanced School in Magdeburg has recently acquired a new laboratory. It includes several computerized welding robots and is being employed for extensive research into the automation of welding technology in the GDR. The computer-aided analysis and control of welding processes is something new. All measurements are fed through suitable channels into a computer laboratory. Here with the aid of appropriate devices these measurements can be evaluated, analyzed in a model MC 80 small computer and processed for further study. While he records measurements during a test, the research student Hartmut Arnold is linked via intercom with the researcher at the welding robot. [Text] [Dresden SAECHSISCHE ZEITUNG in German 24-25 Nov 84 p 3] 8008

CSO: 2302/52

SOFTWARE FIRM THRIVES IN PARIS

Budapest OTLET in Hungarian 25 Oct 84 p 23

/Article by Katalin Gorgei: "How Does PROPER Prosper?"/

/Text/ We have reported already in our paper about our experiences at the SICOB '84 Computer Technology World Exhibition held in Paris. But what is more natural when wandering about such a place than seeking out the domestic exhibitors. At the end of a list of exhibitors of many pages we found a single familiar name--the Computer Technology Coordination Institute (SZKI). For the first time this year, the SZKI got a stand of 28 square meters in the central glass hall of several stories, and was not forced into a 9 square meter stand in the attached "also ran" building. Not by chance.

The SZKI was not participating in the Paris SICOB exhibition for the first time. It has appeared here regularly for the past 4 years with the exporter of its products, the Metrimpex Foreign Trade Enterprise. But its role this year was different. They have established a subsidiary enterprise in Paris, PROPER, and their appearance as a firm on the market convinced the organizers of SICOB '84 that their place was in the central exhibit hall, in the spotlight of professional interest.

PROPER is an export-import enterprise dealing with software whose slogan at the Paris exhibit--its founders have more faith in the future--suits its past; it called attention to itself with : "PROPER--Your contact with Hungarian gray matter." Some of the visitors were surprised, but the majority, after they realized Hungarians were involved, mumbled to themselves something like this: "Hungarians...that is different. They understand this business." The SZKI paraded its high performance program packages on an IBM, an Apple and a personal computer of French manufacture.

"We did not bring out domestic machines," explained Laszlo Binder, deputy director of the institute, "because ours are more expensive, and in a few technical parameters more backward than those we demonstrated here. In addition to the French and the large American firms, which are in the majority, the Japanese, Korean and Taiwan

manufactures are waging a vicious price war, and we would only lose out in that. And if we could sell hardware we would have to build up a service network, and we would come out losers just because of that. And we are not running our software on Hungarian machines because then we would have to explain immediately that 'It will run on yours too!'--and they may or may not believe it."

So for the time being PROPER does not have to explain anything, at home or abroad. It is still a newborn enterprise, it has just found suitable office space, which will be furnished from here at home. For the time being they travel on mass transit with a monthly pass, but they know that in Paris a "firm" will need a car. For the time being they cannot get a new car, because this would eat up three quarters of their base capital. But they must give something to fashion; a used car must not have an appearance at which the partners would smile. And there are the well known problems of founding an enterprise.... At the moment the SZKI can brag of trade on the French market of hardly more than 100,000 dollars. By the end of the year they would like to increase this to near one million dollars, through the good offices of PROPER. But PROPER is not limited to trading only the products of the SZKI. It has no independent foreign trade rights, so it enters into business relationships with all the domestic computer technology enterprises and institutes through the appropriate foreign trade enterprises. At their stand at the SICOB were prospectuses from the SZAMALK /Computer Technology Applications Enterprises/ and a representative of the Interag KKV /retail enterprise/. The SZKI does not consider the partner relationship of the foreign trade enterprises to be disadvantageous--in contrast to much other domestic opinion. The foreign trade enterprises today understand trade in computer technology products--they say. Ten years ago 95 percent of the software export of Metrimpex came from the SZKI. The SZKI handled most of the administration necessary for export, and their contacts were formal. Today the products of the SZKI represent only 60 percent of the trade of Metrimpex, but this has not meant a decrease in volume.

"We do not want a price war with our Hungarian colleagues!" announced Laszlo Binder. Hungarian software has won real success in the FRG, but the same cannot be said in France. But it is a good reference to be in computer technology on this market. This is why they established PROPER. They did not want to lease out people, and then not know what they were doing; they want to sell software, to develop it in commission work if necessary. They are also cooperating with Novotrade. Mr Stein, the exclusive European representative of Novotrade, visited them at the exhibit, and they worked out jointly where which of them would enter into business contacts by virtue of their direct contacts. Naturally everyone works for money. At home they still find it hard to understand that an agency takes 30 percent of the receipts--this is what they are asking. But if they were working with a French agency they would not get off for under 40-70 percent.

"Do you feel that the hardware development background is ensured for exploitation of the foreign market possibilities?"

"In certain areas yes, but our relative backwardness is increasing everywhere. There would be a need to invest a significant part of the money earned with software directly in the tools needed for development. We must buy the most modern machines obtainable and develop software on them while there is still a great demand for it. Naturally there are many machines we cannot get to develop the software for at home. I feel that PROPER will be a help in this area too. We are being very careful not to violate the prescriptions of the embargo. But there is no obstacle to preparing software at home for a compatible machine and we adapt this here in Paris for the computers working abroad. In this way we could get onto markets which we could not get onto in the absence of hardware."

"What lessons did the SICOB '84 provide in regard to software?"

"It has been said for a long time that there has been a great proportionate shift in computer technology systems to the benefit of software. Programs make up about 70-80 percent of the complete value. Despite this, experience has shown that the computer is the prime thing in the eyes of the user. An elderly gentleman has just refuted this here at our stand. He is a private dealer in medical supplies and he asked what software offerings we had which could keep records on medicines, patients, etc. We asked what sort of computer he had, but it turned out that he did not have one. He was at the SICOB first to look for a program package which suited him, and then he will select a computer for it. Up to now the large computer firms have developed their machines and the software houses--such as ours--prepared programs for them. Now the computer program is decisive for the user, and increasingly the machines must adapt to them."

8984
CSO: 2502/17

HUNGARY

NEW REGULATIONS FOR TECHNICAL DEVELOPMENT FINANCING EXPLAINED

Budapest HETIVILAGGAZDASAG in Hungarian 17 Nov 84 pp 38-39

/Interview with Edit Javorka by Erika Zador: "Paid R and D"/

/Text/ There is no need to prove that in international economic competiton only those firms have a chance which are innovative, that is they themselves participate actively in technical development, or quickly apply the results of it. Here at home also it is obvious that there is a need for modernization of the regulation of technical development as part of the further development of the economic regulators. According to the plans a detailed guide concerning the modofied regulators and their application will be published on 15 November by the OMFB /National Technical Development Committee/. We talked with Edit Javorka, editor of the guide, about the changes to be expected in the regulation of technical development.

/Question/ What are the chief changes one can count on in regulation of technical development?

/Answer/ The modification of the regulators for technical development is not an entirely new process, it began in 1980. As a first step the research institutes dealing primarily with applied industrial research and development were reclassified as enterprise research sites or reorganized into research and development enterprises. These institutes and enterprises are practically self-maintaining, they get the money for their activity by fulfilling contracts and get support from the state budget only for certain jobs which can be classified primarily as basic research or development of the research infrastructure.

The next significant step was taken last year when we eliminated the obligatory technical development fund, the so-called "mufa," at about 65 percent of the enterprises. In Hungary the annual "mufa" of the enterprises comes to about 10 billion forints, and the 65 percent of the enterprises mentioned provide about half of this. As the next step the generation of the technical development fund will not be obligatory anywhere in 1985--disregarding a few exceptions. Naturally

this applies only to the part of the national "mufa" remaining at the enterprises, the approximately 10 billion forints. The part which had been centralized up to now will continue to be withdrawn from the enterprises as a tax, to support stressed research and development tasks.

The domestic R and D costs are distributed as follows. In the Sixth 5-Year Plan nearly one-quarter of the more than 20 billion forints turned to this purpose came from budgetary sources, one-quarter from the centralized technical development fund withdrawn from the enterprises, and the rest remained at the enterprises.

/Question/ But I know that some of the enterprises did not entirely use up the obligatorily generated "mufa." What could be the cause of this?

/Answer/ A part of the reserves generated serves as financial cover for earlier contracts, another part derives from the fact that the enterprise did not have enough money for some development. It also happened, of course, that the fund generation was excessive, but at the same time a few enterprises exceeded the technical development fund at the cost of their profit.

/Question/ What will the centralized "mufa" and the sums coming from the budget be used for?

/Answer/ The budgetary research institutes maintain themselves on the funds coming from the budget. The OMFB, the Hungarian Academy of Sciences and the ministries finance research tasks stressed by the national medium-range research and evelopment plan and other research tasks which are important to the national economy from the centralized "mufa." Naturally the firms have also purchased intellectual products of the research and development sites using the "mufa" remaining at the enterprises. The enterprises could also get support for their R and D activity from central allocations, if they themselves assumed--usually--50 percent of the costs. Naturally the modifications of the technical development regulation affect many aspects of development--such as, for example, bank credit, price regulation, assignment to an enterprise guidance form, special wage regulation--which are extraordinarily ramified. So we thought it would be useful to the enterprises if we published as a guide the details of what must be known, simultaneous with the appearance of the regulators.

/Question/ What is the justification for treating a few chemical industry and machine industry enterprises as exceptions?

/Answer/ We are talking about enterprises dealing with activities much more demanding of research than the average. In any case, ending

the obligatory generation of a technical development fund does not mean that the new regulators will "dissuade" the enterprises from technical development elsewhere. The new regulators simply refer to the enterprise sphere the decision about the indispensable technical development, as an important tool for survival. But since the different enterprises probably will not judge the need for innovation in the same way, those responsible felt that in a few areas technical development could not be entrusted to the enterprise alone.

/Question/ The obligatory generation of "mufa" in itself did not mean either moral or material incentive for the realization of enterprise developments. What sort of economic incentives will encourage development with introduction of the modified regulators?

/Answer/ In my opinion the most essential new aspect of the modified regulators is that no distinction is made between enterprise and research institute R and D activity. This puts enterprise R and D into a competitive situation. Up to now various concessions--such as for example, the profit tax concession and the possibility for research institutes to dispose of their developmental achievements in profit sharing deals--applied only to the research institutes and the developmental enterprises. In professional terms, the regulation was subjective. Hereafter the activity will be unambiguously decisive, not the assignment.

/Question/ What do these concessions represent?

/Answer/ That, for example, one has to pay a profit tax of only 9-15 percent instead of 45 percent. Or that the independent research sites could take advantage of accelerated write-off, amortization, for machines and equipment expressly serving research and development activity which bdcome outmoded very quickly.

/Question/ So hereafter every enterprise can get these concessions in return for successful R and D activity?

/Answer/ It is not so simple. The enterprises do not get the concessions for technical development carried out within their own area. This means that if they do not sell their developmental results then they get no sort of preference. But products at a higher technical level, created as a result of development, will certainly bring a greater profit, so development in itself is a paying proposition for the enterprises.

/Question/ The American journal HARVARD BUSINESS REVIEW has published a table from which it appears that 25 percent of the money spent on technical innovation is returned within one year at the enterprise carrying out the development. But if we project the innovation onto

society as a whole, that is take into consideration the return attained by the purchasers of the development or the developed product, then this ratio is 70 percent. This shows that innovation cannot be treated as an enterprise interest alone.

/Answer/ This is certainly true, but this indirect valuation of social utility does not "fit into" the present regulators. Beginning next year the modified regulators will award the concessions mentioned to those enterprises which hand on to others or sell their technical development achievements. That is, only if an achievement born in a certain development site is purchased elsewhere can the seller take advantage of the not small possibilities offered by the regulators. (In this case it makes no difference whether the development site can be found within the enterprise or the developmental achievement became an enterprise one by virtue of a contract, because the work was done on the money of the enterprise.) In addition to what has been mentioned it is also possible, for example, for the amortization of the developments to be 30 percent per year instead of the customary 8-10 percent, it can even reach 100 percent. This can happen if the result of the development is sold on the basis of a prior agreement; in such cases the Ministry of Finance will usually approve the 100 percent write-off.

Among other things the modification of the regulators is intended to aid trade in domestic intellectual products. It wants to make people aware that not only machines and finished products are commodities, but so are intellectual investment and intellectual services. In developed countries there are very many enterprises which trade only in such commodities. For example, there are 20,000 of them in England and 1,200 even in India. Only about 100 such firms can be found here, and they were founded primarily in the last few years.

Tables published with article:

Table 1. Sources of Domestic Research and Development Expenditures in 1983

	Expenditures in: Billion Forints	1982=100
Enterprise and centralized technical development fund	17.6	92.4
Of this, Investment	1.8	91.7
State budget	5.2	102.1
Of this, Investment	0.5	139.5
Segregated state funds	0.4	126.5
Other domestic sources	0.3	116.5
Foreign sources	0.1	81.7
Total	23.5	94.7

Table 2. Domestic Research and Development Expenditures and Investments

	1970	1975	1980	1981	1982	1983
Research and development expenditures in percent of national income	2.79	3.46	3.75	3.70	3.59	3.15
Research and development investments in percent of national economic investments	1.88	1.67	1.61	1.54	1.45	1.42

Table 3. More Important Data on Domestic Scientific Work

	1982	1983
Number of research themes and development tasks being worked on	30,484	30,073
Of these, in cooperation with:		
--CEMA countries	2,077	1,996
--other countries	619	552
Number of books published	1,346	1,456
Number of articles published	20,106	22,455
Number of innovations submitted	4,639	5,002
Number of inventions submitted		
--domestically	1,028	1,151
--abroad	1,608	1,434
Number of foreign trips for scientific purposes	20,838	21,487
Of these, to socialist countries	13,054	13,558

8984
CSO: 2502/17

COUNCIL OF MINISTERS AFFIRMS PRIORITY OF COMPUTERS, MICROELECTRONICS

Budapest MAGYAR HIRLAP in Hungarian 23 Nov 84 p 5

[Article by Kristof G. Kocsis: "The Electronics Program"]

[Text] On Thursday the Council of Ministers accepted the concept of the "Central Economic Development and Organization Program [EEKGP] Encompassing the Economic Guidance Tasks for the Spreading of Socio-Economic Use of Electronics." The comprehensive program with the long name outlines the tasks of the future, primarily of the 1986-90 period in connection with electronics. Its essence is that the emphasis has been placed on the word 'use,' and in the spirit of further improving the economic mechanism during the course of implementation it is built on the economic regulators and the storehouse of technical coordination. It counts basically on enterprise resources, and intends to use central financial tools only for the interbranch tasks: to expand the telecommunications network, develop computer systems to support the work of the national administration, increase the level of electronics education, and a few research-development projects of national significance.

The three basic pillars of the concept are the development of broad public opinion ready to accept electronics, creation of an interest system to encourage application, and ensuring the necessary means. In accordance with this the new electronization concept differs in several respects from similar programs defined in the past. Its predecessors are: the CZKFP [Centralized Development Program for Computers] developed to proliferate computer technology; it can look back on a 15-year past--and the EKFP [Centralized Development Program for Electronics] defined 5 years ago, aimed at developing the electronics spare parts industry. Even though they both also affected the socio-economic life as a whole, in essence they still influenced only a definite circle of enterprises and institutions. But nowadays it is already clear to everyone that the computer technology and in general, the electronization is not only the cause of the few thousand technicians and engineers who work on it. Today, for example, 5,000 of this country's enterprises regularly use computer technology in their work, and in the meanwhile 200-250,000 trained computer technicians have also graduated from the educational institutions.

It is typical that while in recent years all domestic investments were decreasing, the one for computer technology developments steadily increased. And not just a bit either, since last year they registered almost twice the growth of

the 1981 investments for this purpose. And we are far from just talking about the computer technology branch of industry taken in the strict sense, as two-thirds of the metal-working machine tools purchased in 1982 were programmable, but we could mention practically any branch as example when the electronics technology has made inroads.

In recent years the conditions for the breakthrough of electronics have changed thoroughly in this country. Computer prices have decreased in this country also, though more modestly than in countries with developed electronization, and the value of human labor has increased. The concept also proposes numerous preferences to be granted by the state, which would make it more affordable for the enterprises to obtain the electronic technologies promised by its perspective. Among other things the ideas include decreasing the prive levels of electronic spare parts, equipment obtained domestically and from socialist import as well as decreasing customs duties. It seems expenditious to temporarily exempt the flexible manufacturing systems, robots and automated design systems--which for the time being are not yet spreading fast enough in this country--from accumulation taxation, but the expansion of lease contracts also belongs here. The preferences will decrease the budgeted incomes only in appearance, since through the application of electronics the experience shows that the enterprise's results and the budgeted incomes will sharply increase.

All this is expected to greatly increase the demand for electronic equipment. Within the EEKGP's framework the steps aimed at developing the electronics industry were not spelled out--this is a task for the enterprises--only the requirements were defined. In any case in the future the domestic electronics industry will have to increasingly contribute to satisfying the demand. But the needs are independent of the size of the country's economy, thus there is no way the country's industry can set itself up to be self-sufficient. We must continue to rely on the multilateral CEMA cooperation agreements. Even before bilateral government-level cooperative contracts have been negotiated with the Soviet Union, the GDR, Czechoslovakia and Bulgaria. Besides this--even though this is the area heardest hit by the Western restrictive measures--the country's industry continues to refuse to relinquish the utilization of certain spare parts, equipment and technologies obtained from the most developed capitalist countries.

According to the plans the developments begun in the first 5 years of EKFP will continue. The growth of the spare parts industry will be faster than industrial average--this will presumable be a lesson for the credit policy--and prices will decrease which will have to be achieved by tax policy tools.

The concept just adopted merely represents a framework for implementing electronization which is expected in the coming years to permeate the society and its economy in a multifaceted way. The proposals which affect the relationships between the Seventh 5-Year Plan and the program are expected to be completed by the second quarter of next year and by the end of the year all branches will also develop their own detailed programs.

8584
CSO: 2502/15

PROBLEMS OF COMPUTER, ELECTRONICS INDUSTRY NOTED

Budapest NEPSZABADSAG in Hungarian 24 Nov 84 p 3

[Article: "The Stake of Modernization"]

[Excerpt] Starting out from various estimates, we are talking about being 10, 20 or even 30 years behind. There is computer production in Hungary. A total of 95 kinds of micro and mini-computer types have been developed, and 83 kinds of them are being produced. At the product show held recently in the Hilton Hotel the professional public could convince itself that we do have the technical and scientific ability in his country to design and produce such equipment. But in spite of the above mentioned 83 types the quantity is extremely low, there were a total of only 5,100 units produced last year. But this ratio also shows that the Hungarian computer industry is extremely fragmented. Consequently its production is expensive and it is going against the wind. Recently in the magazine entitled VALOSAG [REALITY], Zoltan Tompe summarized in a study that without the appropriate industrial support--that is, for example, spare parts producton--the Hungarian microelectronics industry which is practically struggling for its very existence, is suffering from chronic shortages. If it wants to get what it needs from the CEMA countries it has to wait for ever because there are plan numbers everywhere. If it looks for solutions in capitalist countries it often meets with embargo problems, in addition to increased foreign currency problems. This takes away the desire of the enterprise to develop technology or to seek product-demanding markets. But standing still or being conservative cannot be permitted in this branch of industry. Recognizing the socio-economic effects of the development of electronics, the National Planning Commission has discussed and adopted a concept of comprehensive central economic development and organization which specifies the tasks for long-range and better coordinated development.

8584
CSO: 2502/15

END